BULLETIN 627 MAY, 1942

Fruit Varieties for Ohio

C. W. Ellenwood, Leon Havis, and Freeman S. Howlett

OHIO
AGRICULTURAL EXPERIMENT STATION
Wooster, Ohio

CONTENTS

FRUIT VARIETIES FOR OHIO

Descriptions of Recommended and New Varieties, with Planting Directions

C. W. ELLENWOOD, LEON HAVIS, AND FREEMAN S. HOWLETT

INTRODUCTION

More attention has been given to a consideration of varieties than to any other phase of fruitgrowing. In spite of the accumulation of much information concerning varieties, the selection of the proper ones for any given location or condition remains a serious and difficult matter. The development of new varieties and the testing of those recently introduced involve much work. Several years of observation are required to evaluate properly the merit of a variety. For these and many other reasons, there is ample justification for continuance of variety trials by the experiment stations.

The comments on the varieties discussed in this bulletin are based mainly on their behavior in the Ohio Agricultural Experiment Station orchards, vineyards, and small-fruit plantings. In most instances, however, the conclusions reached as to the value of a variety have been influenced by its performance elsewhere in the State.

Within the past 20 years, many new varieties of most of the more important kinds of fruit have been introduced. An increasing number of these new varieties is the result of breeding work at experiment stations. In other instances, varieties have originated as bud sports of well-established varieties. Some of these new varieties have proved their value and have been included in the list recommended for planting. Others are still under observation.

FACTORS THAT INFLUENCE CHOICE OF VARIETIES

The changing demands of the market influence the choice of varieties for commercial planting. Color prejudice against a variety may seriously affect its acceptance by large numbers of consumers. Grimes Golden and Rhode Island Greening are illustrations of formerly leading commercial apple varieties which have met serious sales resistance in recent years. On the other hand, such varieties as Cortland and Turley, and the red strains of a number of the standard apple varieties, as well as several new varieties of the stone fruits, have been well received by the trade and give promise of being valuable additions to the commercial list.

The susceptibility of certain varieties of fruits to disease and insect ravages is another factor which influences the selection of varieties. An example is the influence of oriental fruit moth on the choice of peach varieties.

The relationship between varieties so far as pollination is concerned is still another factor bearing on the choice of the proper varieties for any given situation. The Ohio Agricultural Experiment Station has issued bulletins dealing with apple (10, 11), pear (12), and cherry (14) pollination.

The requirements of different varieties as to pruning, spraying, fertilizer treatment, and thinning are not fully understood, but it is well known that all these practices have to be adjusted to meet varietal characteristics.

High average annual yields per tree are essential, and growers should investigate carefully the possible production of varieties to be included in commercial plantings. Early bearing is generally desirable in all tree fruits, but equally important is the possible capacity of the tree to bear large crops once it has reached maturity. Yield and date of bloom records of a large number of apple varieties growing in the Station orchards over a long period of years have been published (4). Such data for peaches (9) and other stone fruits (6) have also been reported.

EXPERIMENT STATION VARIETY TRIALS

The first orchards, small-fruit plantings, and vineyards planted by the Experiment Station in 1893 were designed for variety trials. In recent years, more emphasis has been placed on other phases of experimental work. However, the number of varieties growing at the Station is still very large; over 350 varieties of apples and several thousand seedlings are under observation. Most of the other fruits are represented by proportionately large numbers.

Varieties found not adapted to Ohio conditions are being eliminated each year, and new ones are being added as they become available. Certain varieties of high quality which have been eliminated from the nursery trade because of shortcomings that keep them from being profitable are preserved in the Station orchards and serve as a source of propagating wood. Trees of many of the newer sorts growing in the Station orchards but not generally catalogued by nurserymen also serve as a source of scions or bud wood for both nurserymen and fruitgrowers. Thousands of bud sticks and scions are cut annually from the Station orchards. The large number of varieties grown in these orchards serves as an aid in the identification of fruit sent to the Station.

BREEDING WORK IN PROGRESS

Apple breeding work has been in progress at the Ohio Agricultural Experiment Station for some time, and up to the present 6,000 seedlings have been grown or are being grown at Wooster. The primary objective has been to obtain a late-harvested, late-keeping winter apple of high dessert quality to supplement or replace Rome Beauty. Particular attention has been given to the late-blooming characteristic. Rome Beauty and Gallia Beauty have been crossed with high-quality varieties, such as McIntosh, Jonathan, Delicious, and Golden Delicious, but the seedlings obtained have, in general, been disappointing. These two late varieties tend to give a very large proportion of seedlings of poor color and poor dessert quality. The varieties McIntosh, Jonathan, and Delicious, when intercrossed, have given the best results of any combination. Present breeding work has the same objectives, but it appears that little progress will be made by employing Rome Beauty and Gallia Beauty. Five varieties have been named, of which Franklin is outstanding. Several promising seedlings are on trial under numbers, such as 2233 and 2230, both Jonathan × Delicious seedlings.

The principal raspberry breeding work in progress at the Ohio Station is for the purpose of developing a variety ripening with, or slightly earlier than, Logan and producing larger and higher-quality berries. Resistance to anthracnose and virus diseases is also desired.

The strawberry breeding work is mainly for the development of a more satisfactory late variety than is now available. None of the strawberry or raspberry crosses is yet ready for release.

PLANTING THE ORCHARD

This bulletin has been prepared mainly to supply information on the varieties of fruit for planting in Ohio. To make this information more serviceable to the fruitgrower, brief planting instructions are included. These planting directions are based on experience at the Station and on a knowledge of the habit of growth of the fruits. Detailed planting directions for strawberries can be found in Ohio Agricultural Experiment Station Bulletin 626 (8) and for raspberries in Bulletin 454 (15).

ORCHARD SITE

Even more important than the selection of proper varieties is the choice of a good orchard site. The two greatest hazards in growing tree fruits in Ohio are frost and inadequate soil moisture. The first consideration, therefore, in selecting a site for tree fruits should be to secure a location which seems reasonably immune from killing frosts during late April and early May. Usually, the highest elevation in a community is the freest from spring frosts. Topographical maps showing elevations at frequent intervals are generally available for reference in the office of the county surveyor. It is also important to study the temperature records and rainfall of the weather station nearest the proposed site. There are two regulation Weather Bureau recording thermometers at the Experiment Station: No. 1 is located near the Administration Building at an elevation of 1,030 feet; No. 2, a mile distant from No. 1, is located at the edge of the Station orchards at an elevation of 1,100 feet. The maximum temperature during May when apples are in bloom averages 2 degrees lower at the No. 1 weather station than at the higher elevation. In this particular instance in a rolling but not hilly section, 70 feet of elevation made a difference of 2 degrees in favor of the higher elevations. It is not suggested here that an equal difference in altitude between two locations elsewhere in the State would result in a corresponding difference in temperature. This experience is cited merely to show the value of giving careful thought to elevation. The relationship between the elevation of the orchard site and the surrounding country is more important than the elevation above sea level. Care should be taken not to locate an orchard adjacent to a woodland where the natural flow of air currents to lower levels will be impeded. Such a condition causes "frost pockets" to form and results in frequent frost injury to the fruit. Areas known to be subject to frequent hailstorms should be avoided.

ORCHARD SOIL

One of the primary considerations in choosing the location of an orchard is soil type. No one type can be classified as best even for any one fruit, but a classification of the soil types found in Ohio, with their evaluation for orchard purposes, is available (1).

The subsoil is probably more important than the surface texture of the soil in the growth and production of an orchard. If the subsoil is impervious or is composed of a hardpan, the location is not favorable, and the orchard is likely to be unsatisfactory or fail completely. Under such conditions, trees or small fruits may grow well for a few years, but when the tops are large and producing fruit, the trees become weak, and if a dry year or a severe winter occurs, the trees may die. It has been found (7) that the rooting habit of

peach trees is especially responsive to different soil types and to poor drainage. A well-drained soil is essential for the success of any fruit crop, in order to facilitate free exchange of gases. A poorly drained soil can often be improved by placing a line of tile between each row of trees or about every 30 feet in a small-fruit planting. In addition to being well drained, an orchard soil should be fairly fertile and should contain enough organic matter to facilitate porosity, absorption of rainfall, and retention of available moisture.

TIME OF PLANTING

Apples, sour cherries, pears, and the European varieties of plums can be planted either in the late fall or early spring. Other fruit should be planted in the spring.

Fall planting has certain advantages over spring. Frequently, the soil is in better condition. Weather conditions are generally more stable in late October or early November than in March or April, and there are also usually fewer windy days then. Nursery stock is less apt to become overheated in transit during the fall than in the spring. A fall-planted tree becomes established through the winter and starts growth earlier than spring-planted trees.

When trees are planted in the spring, it is necessary to get them set as early as the ground can be fitted; frequently, spring-planted trees fail to grow because of late planting. A compromise between fall and spring planting is to purchase the trees in the fall, have them delivered, and then heel them in by completely or partially covering them with soil. This procedure insures against a delayed delivery in the spring.

PLANTING PLAN

The two orchard planting systems in most common use are the square or rectangular, and triangular or hexagonal plans. They and the contour system are the principal planting plans used in Ohio.

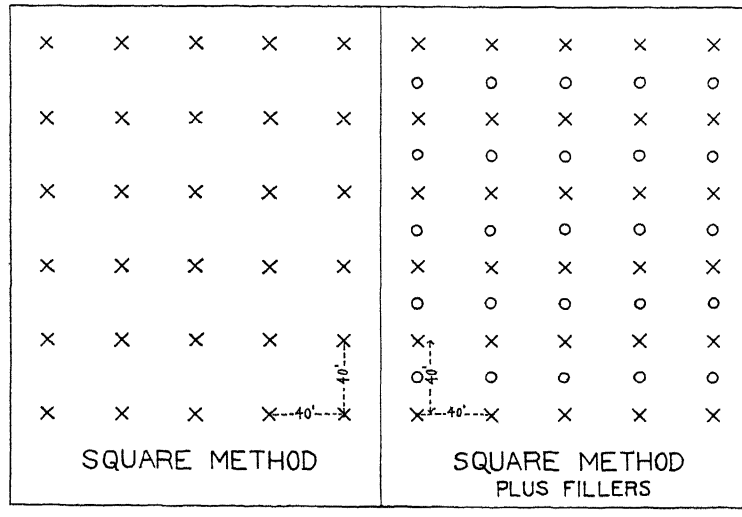

Fig. 1.—Square or rectangular planting plan

The square system is the easiest to establish and is more convenient for cultivation and spraying than any other. Under this plan, the trees can be aligned in all directions. This system is better adapted to the use of filler trees (fig. 1). The rectangular system is only a slight variation from the square plan, and in this discussion the plans are treated as one. Cross-cultivation or spraying may not be so easily done in the rectangular plan as in the true square method. Another variation from the square system is the quincunx plan (fig. 2), in which a tree is set in the center of the square or rectangle made by four permanent trees.

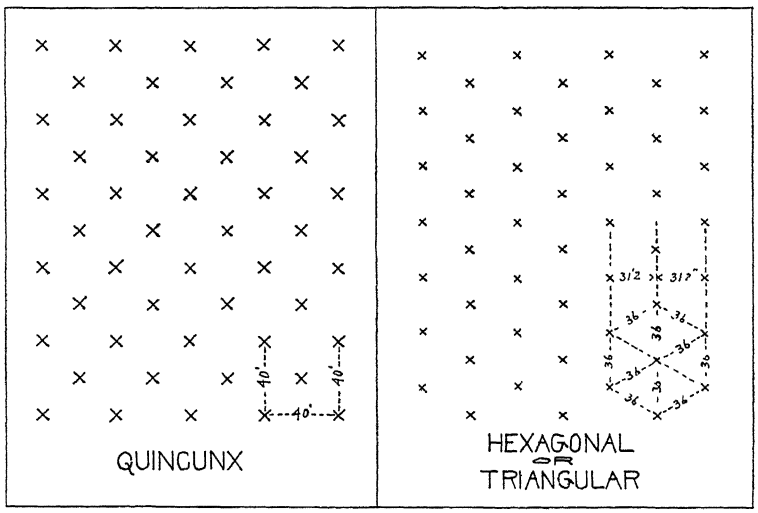

Fig. 2.—Quincunx and hexagonal or triangular planting plans

In the triangular or hexagonal system (fig. 2) the trees all stand equally distant from each other as measured from the center tree in any given hexagon in the orchard. This planting plan offers the possibility of a more equal distribution of tree tops and roots in a given area. About 15 per cent more trees per acre can be planted under this plan than with the square.

A secondary plan used to some extent is the contour system. Under the contour system of planting, the trees are set in rows following the natural contour of the hill. Perfect alignment is possible in only one direction. Such an arrangement in a hilly section makes it possible for sprayers and other vehicles to be conveyed over the ground more easily than if the square or hexagonal system were followed.

A variation from the square system sometimes employed is known as the rectangular offset plan. This plan is particularly adapted for planting mixed blocks of standard and red strains of a given variety when the grower is uncertain as to the value of the red strain for his growing and market requirements. Under this plan, the trees are set in rectangles; for instance, the rows may be 35 feet apart with the trees 20 feet apart in the row. In the first row, tree A may be a standard variety, tree B a red strain of that variety; tree C would be a standard, and the alternation would continue thus throughout the

row. In row 2, the planting arrangement is reversed. Tree A would be the red strain and tree B the standard variety. In 16 to 18 years, it will be necessary to remove half the trees in each row, and when the trees are set in the manner just described, the grower can use his discretion as to which variety he will leave as the permanent tree in each row, and regardless of the variety chosen, the total number of trees left will not vary greatly. This system is also adaptable for variety groupings other than the standard and red strain setup suggested here.

Another adaptation of the square or rectangular system of planting is being used by a few growers in Ohio to develop what is termed a perpetual orchard plan. The original planting includes only permanent trees set at 35- or 40-foot distances. When the original planting is from 15 to 20 years old, a young tree is planted in the center of the original tree square. This plan contemplates the removal of the original trees about 30 years from the date of planting. The orchards being developed under this plan have not progressed far enough to determine the value of the plan.

LAYING OUT THE ORCHARD

The details of the several steps necessary in laying out an orchard were very concisely stated by I. P. Lewis (13) as follows:

> "The laying out of the orchard is sometimes a rather difficult problem, especially on rough or rolling ground, and should be carefully done in order to get the rows as nearly straight as possible in all directions. Carefully laid-out orchards with trees well aligned are most satisfactory both in attractiveness and ease of operation. The first step is to establish a base line along one side of the field, allowing ample space between the boundaries of the field and the first tree rows. A line fence or roadway may be used as a base line, or surveyor's instruments may be used to establish the line. Stakes are then set along this line at the proper distance for planting the first row of trees.
>
> "A carpenter's square or right angle made of wood strips is next set on three stakes at the end of this row or new base line placing the point of the square on the end stake. One side of the square is brought in line with the base, and by sighting along the other edge of the square, a stake can be set establishing a line or row at right angles to the base line. This row is then measured off at tree distances, and stakes are set. The square is then moved to the end of this row, and the system is repeated until stakes are set on all four sides of the orchard area. If the ground is very uneven, it will also be necessary to set rows of stakes through the orchard in both directions at distances that can be readily seen. After this guide staking is done, three men set the stakes. The first sights in one direction, the second in the other direction, and the third man sets the stakes in position as signaled by the men doing the sighting. The guide stakes should be of light color and large enough to be seen readily. The remainder of the stakes need only be large enough to establish the position of the tree. If the ground is uneven, a few long poles with the bark peeled off the top end to show white will be very useful for sighting.

"In staking an orchard for setting by the triangular or hexagonal method, a base line is established along one side as before mentioned. Then a large triangle with a ring in each corner is made of heavy wire or chain, the sides of which are the length of the planting distance desired. When two of the rings are placed over stakes on the base line, the third ring will exactly locate a tree in the second row. By using each new row as a base line, the remainder of the stakes may be set in like manner until the whole area is laid out.

"Another method used when only two men are available for the work is to prepare a wire in length equal to the exact distance the trees are to be planted apart and with a loop in one end large enough to hold a small pointed stick. One man then places the end of the wire at a stake on the base line and the other, with the stick through the loop, strikes a small segment of a circle upon the ground where he thinks the stake should go. The wire is then held to the next stake in the row, and a second segment struck crossing the first. Where these two segments cross is the location of a tree in the second row. Likewise the succeeding trees and rows are established.

THE PLANTING BOARD

"No matter how carefully aligned the stakes may be, a planting board should be used when digging the tree holes and in planting, to ensure the trees' being located exactly where the stakes stood. This board is about 4 feet long and 6 inches wide. A V-shaped notch is sawed in the center of each end. Then, in the center of the board and exactly midway between the notches in the ends, a hole is bored with an auger or large bit, and in turn, from one of the outer edges of the board and exactly opposite the hole in the center, a section of wood is sawed out between the hole and the outer edge, leaving a slot extending from the margin to the center of the board.

"Before beginning to dig a hole for a tree, place the planting board on the ground with the stake marking the location of the tree in the slot exactly where the auger hole was bored. Next drive two short wooden pegs in the ground closely in the V-shaped notches in the ends of the board. The board then may be removed, and the hole dug. The planting board is then readjusted in its former position with the pegs engaged in the V-shaped angles at the ends. A few shovelfuls of the fine topsoil are thrown in the bottom of the hole, and the tree is placed in position with its stem in the slot at the center of the board and the roots well spread out. The roots are shifted one way or another until the body of the tree stands in a perpendicular position exactly where the stake formerly stood. A few shovelfuls of fine soil then may be worked in beneath, among, and around the roots, and the planting board can be removed."

PLANTING DISTANCES

The proper planting distances are determined by the fertility of the soil, growing habits of the variety, whether fillers are to be used and if used, in what manner, and to some extent by the cultural and pruning practices which are to be followed. Convenience of handling such tools as sprayers, tractors, and cultivators in an orchard should also be considered in establishing the distances.

The Wealthy, being a relatively small tree, requires less space than a variety like Northern Spy, which develops into a very large tree. Trees on fertile soils attain greater size than those on the less fertile soils frequently found in the hilly country.

The following distances are recommended for permanent planting:

FRUIT	FEET
Apples	35 to 45
Pears (standard)	25 to 35
Pears (dwarf)	10 to 15
Peaches	20 to 25
Plums	20 to 25
Cherries (sour)	20 to 25
Cherries (sweet)	25 to 30
Quinces	10 to 15

To find the number of trees or plants required to plant an acre under the square or rectangular plan, multiply the distances of each side in feet and divide the product into 43,560 (square feet in 1 acre).

Table 1 gives the approximate number of trees or plants per acre when set at different distances.

TABLE 1.—Number of trees or plants required to plant an acre

Planting distance	Square or rectangular method	Triangular method	Planting distance	Square or rectangular method	Triangular method
Feet			*Feet*		
1 by 4	10,890	.....	20 by 20	108	124
1½ by 3½	8,300	.....	22 by 22	90	104
3 by 8	1,815	.....	25 by 25	70	80
3 by 9	1,613	.....	30 by 30	48	56
4 by 8	1,361	.....	35 by 35	35	40
4 by 10	1,089	.....	40 by 40	27	31
8 by 10	544	.....	45 by 45	22	25
10 by 10	436	502			
15 by 15	194	223			

PLANTING DISTANCES IN RELATION TO THE LIMITATION OF THE AGE OF APPLE ORCHARDS

There is an increasing interest among commercial applegrowers in limiting the life of their apple orchards to 25 or 30 years, because the growing and harvesting costs per bushel tend to increase after the trees reach the age of 30 years. Moreover, disease and insect control is more difficult on older trees, and the color and size of the fruits are poorer.

In a survey (2) of Ohio orchards conducted by the Experiment Station's Department of Horticulture in 1939, approximately 75 per cent of the commercial orchardists responding to the inquiry: "During what years of the life of your apple orchard have you secured the most economical production?" listed the most profitable period as between 15 and 25 years from planting. Another 15 per cent gave the period from 15 to 30 years, and the remaining 10 per cent replied that the period of most economical production had extended from 15 to 35 years. None of the growers responding to the inquiry reported most economical production for a period extending from 15 to 40 years from planting.

Total production and economic production should not be confused, for experience in the Station orchards has shown that the average annual production will increase past 35 years from planting.

In new plantings where apple trees are set with definite plans to remove the orchard at 25 or 30 years from planting, the distance between trees need not be quite so far as when the trees are left for longer periods. The planting distances for apples recommended previously in this bulletin are based upon conventional orchard practice.

APPLES

CLASSIFICATION OF VARIETIES

The total number of apple varieties listed by American nurserymen has gradually decreased in recent years, but a checkup of 75 nursery catalogs for the year 1941 showed that there were 275 varieties listed for sale. Obviously, many of these varieties are not suited for planting in Ohio.

In the following apple classification, an attempt has been made to separate the varieties into three groups: varieties for commercial purposes, varieties for home use, and varieties for roadside market. It is not to be understood from this grouping that a variety placed in one classification is eliminated from consideration in another, but rather that a given variety should be considered primarily fitted for the use suggested; for instance, Grimes Golden, Jonathan, Delicious, and others listed for commercial uses are splendid varieties for home use. A few of the varieties listed for home use also have limited commercial value.

TABLE 2.—Varieties of apples recommended for commercial planting
(Listed in approximate order of ripening)

Lake Erie region	Northeastern counties	Eastern and southern counties	Southwestern counties	Central counties
Yellow Transparent	Yellow Transparent	Yellow Transparent	Yellow Transparent	Yellow Transparent
Lodi	Lodi	Lodi	Lodi	Lodi
Wealthy	Wealthy	Wealthy	Wealthy	Wealthy
McIntosh	Ohio Nonpareil	Grimes Golden	Grimes Golden	McIntosh
Cortland	McIntosh	Jonathan	Jonathan	Grimes Golden
Jonathan	Cortland	Delicious, Starking, or Richared	Delicious, Starking, or Richared	Jonathan
Delicious, Starking, or Richared	Jonathan	Turley	Turley	Delicious, Starking, or Richared
Northern Spy or Red Spy	Delicious, Starking, or Richared	Golden Delicious	Golden Delicious	Turley
Baldwin	Baldwin	Stayman Winesap, Staymared, or Blaxtayman	Stayman Winesap, Staymared, or Blaxtayman	Golden Delicious
Stayman Winesap, Staymared, or Blaxtayman	Stayman Winesap, Staymared, or Blaxtayman	Rome Beauty, Gallia Beauty, or Red Rome	Rome Beauty, Gallia Beauty, or Red Rome	Stayman Winesap, Staymared, or Blaxtayman
Gallia Beauty or Red Rome	Rome Beauty, Gallia Beauty, or Red Rome			Rome Beauty, Gallia Beauty, or Red Rome

Varieties of apples for home use.—Battle, Benoni, Cox Orange, Garden Royal, Jefferis, Joyce, Melba, Mother, Rambo, Sweet Delicious.

Varieties of apples for roadside market.—In addition to those on the commercial list, there are Chenango, Early McIntosh, Joyce, Maiden Blush, Melba, Ohio Nonpareil, Red Gravenstein, and Summer Rambo. Crab apples are Dolgo, Hyslop, and Transcendent.

Certain apple varieties are adapted for use as fillers. Some of these are Cortland, Golden Delicious, Jonathan, Rome Beauty, Wealthy, and Yellow Transparent.

CHARACTERISTICS OF VARIETIES

Brief notes on the general characteristics of a number of varieties of apples are presented here. The date of bloom, date of first picking, and yield that follow the descriptions in these notes are taken from the records of tree performance in the Ohio Agricultural Experiment Station orchards. These records in many instances cover a period of 30 years.

For the convenience of the reader, the varieties are separated into three general groups: The first group includes the varieties recommended for commercial purposes, home use, and roadside market. The second group includes some of the newer varieties, the value of which has not been fully determined. The third group includes a number of varieties of minor importance, some of which have limited value for one purpose or another. The recommended varieties are divided into two sections: summer and fall varieties, and winter varieties. For this purpose, the picking season for Ohio Nonpareil and McIntosh is established as the end of the fall period. Varieties harvested later than these varieties are classified as winter varieties.

Recommended Varieties

SUMMER AND FALL (IN ORDER OF RIPENING)

Yellow Transparent.—This is one of the earliest varieties and is well adapted to all sections of Ohio. It comes into bearing at an early age and, under most conditions, is a biennial bearer. Young, rapidly growing trees are often seriously affected by blight, as are also the blossoms of mature trees. The tree is of rather small, upright growth and is well adapted as a filler. Apples can be used early in July and are unusually good for cooking. May 8; July 22; 11.9 bushels.

Lodi.—This variety is a cross between Yellow Transparent and Montgomery and is one of the New York seedlings. It is a few days later than Transparent but otherwise very much like that variety. Where it is desirable to extend the Transparent season, Lodi can be recommended. May 8; July 27.

Melba.—This variety originated at the Central Experiment Station, Ottawa, Canada. It is of the McIntosh type in general appearance and quality of fruit. Its season is early August. It is the first apple of the season to have excellent dessert quality. Melba is excellent for home use, but its flesh is exceedingly tender, and its commercial value is limited to roadside or local market. The tree is moderately vigorous and tends to bear crops biennially. May 5; August 7; annual yield for first 10 years of production, 6.3 bushels.

Battle.—This apple is a seedling of Wealthy that originated at the Central Experiment Station, Ottawa, Canada. It continues to be one of the most promising of the newer summer varieties. Its season is early to mid-August, a little later than that of Oldenburg, and its quality is much better than that variety.

Joyce.—This variety has the same origin as Melba and like that variety takes on the McIntosh quality. The overcoloring is duller and less attractive than that of Melba. The tree is more vigorous than Melba and like that variety has a tendency toward biennial bearing. The variety is suggested only for home use and roadside markets. May 6; August 21.

Early McIntosh.—This is a New York Station McIntosh × Yellow Transparent cross. It ripens about 3 weeks later than Transparent. Its color is similar to that of McIntosh. It has a distinctive and heavy bloom. This variety responds very nicely to sun-coloring and also harvest spray treatment. The size of the fruit tends to run small. This is a good variety for roadside markets.

Benoni.—The small size of the fruit of this variety is fully counterbalanced by the attractive coloring and high dessert quality. The tree grows slowly, is upright in habit of growth, and bears alternate heavy and light crops. May 5; August 23.

Chenango (Strawberry).—This variety is very attractively colored, being a pale yellow splashed and streaked with bright carmine. It is of good size, typically oblong-conic in form, and ripens in mid-August. Its quality is very good, and its fruit has a pleasing aroma. The fruit is too tender to warrant extensive planting, but for roadside markets and home use it takes high rank.

Garden Royal.—This little apple is of value only for the home orchard, but among varieties of its season or earlier, it has no superior for dessert purposes. It ripens in late August.

Red Gravenstein.—This variety is one of the red strains which can be rated as a definite improvement over the parent variety. Gravenstein has always been rated as a very high-quality, late summer apple, but as grown in Ohio, it has been lacking in color. Red Gravenstein is one of the most attractive of the fall apple varieties, is excellent for culinary use, and acceptable for eating out of hand. May 5; August 22.

Jefferis.—This is an excellent dessert apple in season during early September. The fruit is tender and adapted to local marketing only. The tree is small and bears alternate heavy and light crops. The season is short, and the fruit is best when picked ripe from the tree. May 8; September 1; 8.6 bushels.

Summer Rambo (Western Beauty).—The fruit of the Summer Rambo is much larger than that of Winter Rambo and is of equally good quality. The tree is vigorous and open growing and bears annual crops. It is affected by blight in some sections of Ohio. The apples can be kept for several weeks in cold storage. Summer Rambo is distinct from English Rambo, a variety not extensively grown in Ohio; Summer Rambo is larger and more oblate than English Rambo, which is an early winter variety. May 8; September 4.

Wealthy.—This variety is well adapted to all parts of Ohio for both home and commercial orchards. It often begins to bear good crops in 5 years from planting; and, with the early rapid growth checked by fruit bearing, it makes one of the most desirable varieties to use as a filler. Mature trees of Wealthy are among the smallest of all standard apple trees and can be set much closer than those of most varieties. The sharp acidity of the fruit when freshly

picked is modified considerably by a few days of ripening after picking. Wealthy keeps well in cold storage until early December, provided the fruit is stored immediately after picking. Since it is generally harvested at about the height of the peach season, the variety is frequently difficult to market profitably in years when apple production is normal or above normal. High temperatures also frequently prevail at that season, adding to the perishability of the harvested fruit unless it is placed in cold storage. Because of these handicaps, careful consideration should be given to possible market outlets and storage facilities before this variety is planted heavily. May 8; September 1; 7.8 bushels.

Maiden Blush.—This is a well-known and valuable variety ripening in September, adapted to both commercial and home orchards, and excellent for culinary uses. The variety is susceptible to attacks of apple scab and blotch and requires thorough spraying. May 9; September 10.

Mother.—This variety is of the highest quality for both dessert and culinary uses among the fall varieties. The tree makes vigorous upright growth while young but is a little slow in coming into bearing, and its growth is much retarded when bearing age is reached. The fruit is susceptible to apple scab. This is one of the definitely late-blooming varieties. The fruit is best when picked while yet firm and allowed to ripen for a few days. It is adapted for the home orchard only. May 9; September 14.

McIntosh (fig. 3).—This is one of the finest of all red apples, but it is only partially adapted to Ohio conditions. The variety grows to a high degree of perfection in New England, but in Ohio, it frequently does not color well enough, and it also drops prematurely. The variety responds to sun-coloring, and where care in pruning and harvesting is exercised, the variety does have at least some commercial possibilities in Ohio for local marketing, especially in the grower-to-consumer channels of trade. The variety is much better adapted for northern than southern Ohio. The tree is upright at first but becomes a round, symmetrical tree when in full bearing. It comes into bearing early and is prolific, producing alternate heavy and light crops. It keeps well in cold storage but is not well suited for storing in common storages. May 7; September 16; 28-year average of 36-year-old trees, 18.3 bushels.

Ohio Nonpareil.—This large apple ripens about the middle of September. It commands a ready sale in competition with all other varieties of the same season because of its size, attractive coloring, and good quality. It is especially valuable for roadside and local market. The variety has been grown sparingly in all sections of the State, more in the northeastern quarter. It blooms early and is moderately productive. May 4; September 18.

WINTER (IN ORDER OF RIPENING)

Cortland.—This variety is the result of a Ben Davis × McIntosh cross made at the New York Experiment Station. Cortland has now fruited for a sufficient length of time to show its value for this State fairly accurately. The variety seems worthy of addition to the list of commercial varieties for northern Ohio at least. The trees are vigorous and productive and come into bearing at an early age. It attains more color than McIntosh and is attractively covered with purplish bloom. The variety holds up well in common storage but loses its flavor rapidly after having reached its prime maturity for dessert. Because of this condition, the variety should be stored in cold storage if it is to be held much later than November 15. The quality holds up well in cold storage. This variety is less susceptible to scab than McIntosh.

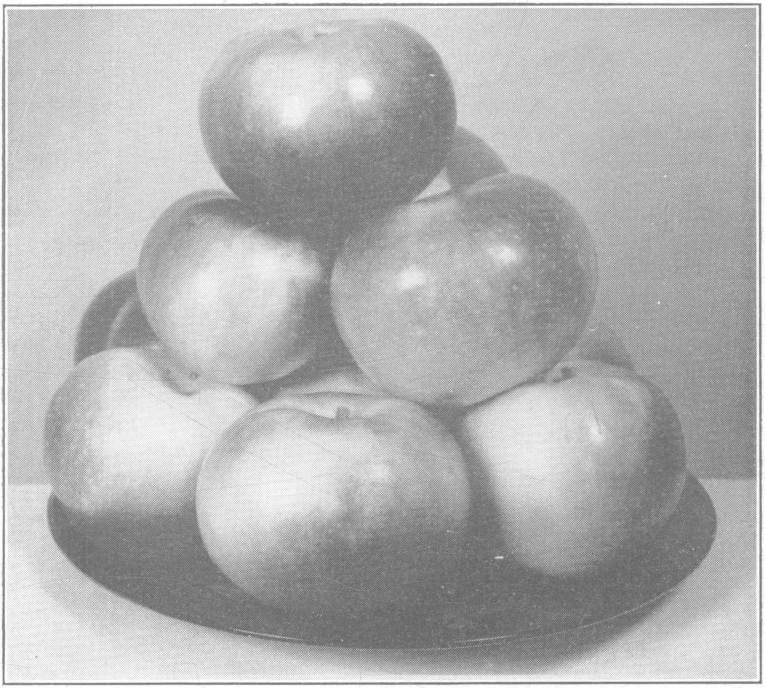

Fig. 3.—A plate of McIntosh, a variety which has limited commercial value in Ohio

Grimes Golden.—This old variety is of excellent quality for all uses, comes into bearing at an early age, and is very productive. It is one of the most productive among the hundreds of varieties tested in the Station trial orchards. The variety has some serious weaknesses, however, which modify its value for commercial uses. The tree is particularly subject to collar rot, a condition which may at least partially be avoided by top-working the variety on resistant stocks. More serious than this tree weakness is the current preference of the market for red apples. The variety is better adapted to the southern than the northern half of the State. Careful consideration should be given to the probable acceptance of the variety by the trade before heavy plantings are made in the future. May 7; October 1; 20.6 bushels.

Jonathan.—A bright, attractive color, high quality, and early bearing make this variety desirable as a fancy market apple. The tree is of slender spreading growth and requires rich soil, in which it gains vigor with age. It is sometimes severely attacked by blight. It can be used either as a permanent or a filler tree. May 8; October 6; 14.1 bushels.

Cox Orange.—This variety is suggested only for home use. It is an old variety and highly prized for both dessert and culinary uses. The fruit is medium in size and not especially attractive, being partially covered with scarfskin. It is ready for picking in early October.

Sweet Delicious.—Originated at the New York Experiment Station as a cross between Deacon Jones and Delicious, this variety was introduced to the trade in 1923. The first parent variety resembles Delicious in color and size. There is little demand for sweet apples commercially, but there is sufficient interest among consumers who prefer a mild variety to warrant the inclusion of a few trees in plantings designed for local markets. Sweet Delicious is probably the best winter sweet apple now available. May 10; October 3.

Delicious.—This is a highly flavored dessert apple for early winter use, which, despite extensive planting, commands a high price on all markets. The tree is of vigorous growth and begins bearing at 6 to 8 years from planting on the lighter soils but is often tardy on heavy, poorly drained soil. It is nearly free from blight and seems to withstand root rot, a weakness to which certain other varieties grown in the State are very susceptible when planted on soil not properly drained. However, Delicious is seriously affected by apple scab if not carefully sprayed. The fruit is inclined to become mealy and to lose flavor after maturity, which is reached in cellar storage in early winter. May 8; October 9; 11.6 bushels.

Richared and Starking.—These two Delicious bud sports continue to equal Delicious in quality and are both much more highly colored than Delicious. Recent observations (5) show that the proper picking date for these varieties is the same as that for Delicious. These varieties are suggested for sections where Delicious fails to color properly. Growers should be sure that their market will prefer the more intense coloring of these varieties to the parent Delicious before shifting completely to these red strains. These varieties always have a pronounced alternate bearing habit. Their average annual yield is high. May 7; October 14; 15.1 bushels. At the present time, the Station does not recommend either one of these two red strains in preference to the other.

Northern Spy.—This is one of the late-blooming varieties adapted to the northern part of the State. The tree is vigorous and healthy and should be given ample space to develop; it is often slow in coming into bearing but with age bears good to heavy annual crops. The fruit has the highest quality for all uses, especially for cooking. May 10; October 8; 15.6 bushels.

Red Spy.—This new variety has not fruited extensively in Ohio. Except for color, it is apparently like Northern Spy in all other characters. As it is much more highly colored than the original Spy, it seems safe to expect it to supplant that variety.

Rambo.—Rambo is an old favorite of high quality but rather small size, best adapted to the home orchard and local markets. Young trees grow rapidly and produce the largest fruit. Thorough spraying is necessary to check apple scab. May 7; October 10; 12.9 bushels.

Baldwin.—This old variety still has a place in the commercial list for northern Ohio. In some years the variety is seriously affected by "Baldwin spot", and, in addition to this inherent weakness, it is not so well received on some markets as it was formerly. The tree is vigorous, with large spreading growth, and nearly always has a pronounced biennial bearing habit. May 7; October 14; 15.1 bushels.

Turley.—This Winesap seedling, which originated in Indiana, has attracted much favorable notice there. In the Station orchards, the Turley trees resemble Stayman in form and bearing habits. The fruit, however, is more like that of Arkansas (Mammoth Black Twig) than Stayman Winesap.

Apparently, the tree comes into bearing reasonably early and is productive. Thus far at Wooster, the quality of the fruit has not equaled that of Stayman Winesap. The fruit has colored rather uniformly throughout the tree but, on the whole, is a little duller in appearance than that of well-colored Stayman Winesap. The fruit does not crack, a condition which is frequently found with Stayman Winesap. The variety has some commercial possibilities in Ohio but should be planted sparingly until it has demonstrated its value in any given locality. May 8; October 17.

Golden Delicious.—This variety has been planted widely in this State and has now been in production long enough to establish its value. The tree is upright in growth and develops rapidly into a symmetrical, well-shaped structure. The variety comes into bearing early and is productive. It does tend to develop alternate bearing, producing a heavy crop one year and only a light crop the following. As the trees grow older, it is necessary to do rigid thinning to ensure fruit of fair size. As with Grimes Golden, there is considerable prejudice against the variety on account of its color. However, where Golden Delicious is well grown, its color is better than that of Grimes Golden, in that the undercolor is a deeper yellow and this condition is frequently accompanied by a bright blush. The tendency of the variety to shrivel can in part be overcome by careful harvesting and storage. In spite of the weaknesses mentioned, the variety does have at least limited commercial value in most sections of Ohio. May 10; October 20.

Rome Beauty.—This apple predominates in the commercial orchards of southern and southeastern Ohio. The commercial usefulness of Rome Beauty extends farther north than was formerly supposed. The variety has given a good account of itself as far north as Wooster. The tree is of upright, moderately vigorous growth, reaches bearing age 8 or 10 years from planting, and usually fruits annually. It blossoms several days after most other varieties. Both leaves and fruit are subject to attacks of apple scab and require thorough spraying. The fruit is of moderate quality, becoming somewhat mealy in late winter. The red strains, Gallia Beauty and Red Rome, are both distinctly superior in color and seem to be nearly identical otherwise; hence, they should replace Rome Beauty. May 10; October 22; 17.1 bushels.

Gallia Beauty and Red Rome.—These two apples originated in southern Ohio and are solid red in color rather than striped red. In other characteristics, they appear to be practically the same as Rome. They can be grown successfully as permanent or filler trees in northern Ohio and are pre-eminently adapted to southern Ohio. Because of the superior color of these red strains of Rome Beauty, they are preferred to the original variety. The Rome Beauty type seems to be particularly adapted to Ohio. Although these varieties do not develop as good dessert quality as a number of other sorts grown commercially in the State, there is probably no other red variety as dependable in production. Spring frost is the greatest single hazard the applegrower has to face in Ohio. Of all the commercial apples grown in this State, Rome Beauty and the red strains of that variety blossom the latest and are most apt to escape frost injury. Gallia Beauty and Red Rome bloom at the same time as Rome Beauty.

Stayman Winesap.—Stayman is the best of the Winesap group for Ohio. The tree (fig. 4) is vigorous, open, of spreading growth, and usually free from disease. It begins to bear at 5 or 6 years from planting, often in annual crops. It is an all-winter apple, keeping in good condition for several months after

maturity. As with other members of the group, a susceptibility to apple scab makes spraying against this disease essential. The weaknesses of this variety are: tendency of the tree toward winter injury, failure of the fruit to attain attractive color in some sections of the State, and cracking of the apples preceding picking time. The mature trees of this variety require annual pruning of a somewhat heavier nature than many varieties in order to assure good color. May 8; October 22; 13.6 bushels (30-year average from 40-year-old trees).

Fig. 4.—18-year-old Stayman Winesap trees. This variety is one of the best for Ohio

Blaxtâyman, Staymared.—These two new bud sports, red strains of Stayman Winesap, are too new to estimate their full value for Ohio conditions. They seem to be like the parent variety except in color. Both are more solidly colored. Just as the red sports of Delicious, these two varieties should be picked at the same time as the parent variety. Where Stayman does not attain good color, it is advisable to try one of these varieties.

Newer Varieties

The following varieties are comparatively recent introductions. Some of them merit trial; others, experience at the Station shows, do not warrant recommendation even for trial. It will be noted that many of these varieties resulted from the breeding work in progress at various experiment stations.

Anoka.—This variety was originated by Professor N. E. Hansen of South Dakota. The tree is dwarfish in growth and comes into bearing very early. It ripens with Oldenburg in August. It is not recommended for Ohio.

Ascot.—Ascot is a relatively new variety of Canadian origin, being a Northern Spy seedling. Its season overlaps that of such varieties as Gravenstein, Wealthy, and McIntosh, and it is inferior to these varieties.

Atlas.—A seedling of St. Lawrence developed by the Central Experiment Station of Canada, Atlas is not promising for Ohio.

Blackmack.—This variety appears to be identical with McIntosh. It is certainly not superior.

Carlton.—Carlton is very similar to Red Astrachan in quality but ripens in season with Red Gravenstein. It is not worth planting.

Close.—This is a new variety developed by the United States Department of Agriculture. It is like Yellow Transparent, except that its color is red. It is worthy of trial.

Collamer.—This variety is very similar to Twenty Ounce but more highly colored.

Colora.—This is a red strain of York Imperial and appears to be equal to that variety in all particulars and better in color.

Crimson Beauty.—This red apple is in season with Yellow Transparent. Its color is attractive. The fruit tends to run small in size. It is not as good as Yellow Transparent.

Daru.—This variety resembles McIntosh. It matures in early winter. Limited experience thus far indicates that the variety does not warrant much promise. This variety blossoms very late.

Early Red Bird.—This red variety ripening in season with Transparent lacks quality and is not recommended.

Franklin.—This variety is the best of the named varieties originating at the Ohio Experiment Station. It is a McIntosh × Delicious cross. It is harvested in late September and keeps about as long as Jonathan. The quality is excellent, being subacid and combining some of the flavor characteristics of both parents. It is more like Delicious than McIntosh in shape and color.

Haralson.—This hardy Minnesota variety matures with Grimes Golden and Jonathan in Ohio and is inferior to those varieties.

Hume.—Hume is a McIntosh seedling from the Canadian Experiment Station. It ripens with Wealthy. Its quality is excellent, but its color is not attractive.

Keetosh.—Keetosh is a cross between Milwaukee and McIntosh which has fair quality. It matures in early September.

Lobo.—This is another McIntosh seedling from Canada. Its season is a little earlier than that of McIntosh. Although this variety is very attractive, its quality is not as good as that of McIntosh, and it is suggested only for trial.

Lovett.—This variety ripens in mid-August. It is not worthy of propagation.

Macoun.—Macoun, a McIntosh × Jersey Black cross originating at the New York Experiment Station, has a tree which is moderately vigorous, medium or below in size, and upright in habit of growth. The variety is harvested 3 or 4 weeks after McIntosh and keeps in storage fully a month longer than McIntosh. The quality of the fruit is good, but not as good as that of McIntosh. The fruit has a tendency to run small, and the average annual yield does not appear to be as great as might be desired. It is worthy of trial.

Medina.—Medina is one of the Delicious type from the New York Experiment Station. It does not seem promising for Ohio. Its color is not so good as that of Delicious.

Orleans.—This is a companion variety of Medina, and although it is better than that variety, it is by no means equal to Delicious or the red strains of Delicious.

Patricia.—This is another McIntosh seedling which has fruited at the Station over a period of years. It is earlier than McIntosh. The quality is good, but the fruit tends to run small and is tender in flesh. It is not recommended.

Red Baldwin.—This is a red strain of Baldwin, but its color is so intense that it is less attractive than Baldwin.

Red Sauce.—Red Sauce is a New York seedling, the flesh of which is tinged with pink. Unfortunately, the quality is very poor. It is hardly worthy of planting even as a novelty.

Red Willow.—Red Willow is a red strain of Willow Twig and preferable to that variety.

Red Wing.—This is another of the northern varieties and is not adapted to Ohio.

Sweet McIntosh.—This variety ripens in late fall. It is not so good as Golden Sweet.

Varieties of Minor Importance

This list embraces a group of varieties which are not first-rate commercial sorts. Most of them are old varieties which for one reason or another have gradually come into disfavor; some of these are still grown in Ohio in considerable volume, and some of them have limited commercial value in restricted areas. They should not be planted for commercial purposes without giving full consideration to their likely acceptance by the trade.

Belmont (Gate, Mamma Beam).—This old variety has never been grown very extensively in Ohio for the market except in the vicinity of Youngstown. The fruit is of excellent quality, both for dessert and for cooking. The season is early winter, and the color lemon yellow, frequently blushed. The flesh is tender, readily showing bruises. The tree blights badly and is only moderately productive. It has too many handicaps to warrant planting commercially.

Hubbardston (Nonesuch).—This is of nearly the same season as Grimes and has a much shorter period of usefulness. It is very mild in flavor.

Northwestern Greening.—This variety never had much to recommend it except productiveness. It is vastly inferior to Rhode Island Greening. The confusion of the two varieties by consumers has undoubtedly worked to the disadvantage of Rhode Island Greening. It is not worthy of planting in Ohio.

Oldenburg (Duchess).—This variety was for many years included among the varieties recommended for planting in Ohio. Its ripening season follows that of Transparent. The variety is useful only for culinary uses, and even as a cooking apple, it is decidedly inferior to Yellow Transparent. In addition, it is a difficult variety to harvest in that it is frequently subject to breakdown. The most serious objection to the variety, however, is that it frequently meets a glutted market. With the addition of Lodi, Melba, Early McIntosh, and other better varieties to the list, it is recommended that Oldenburg be discontinued.

Red Canada (Steele's Red).—This is another old variety which can be omitted from the list for Ohio. There is no special demand on the Ohio market for it. The quality of the fruit is good. It is in season with Baldwin and does not develop the storage troubles which that variety sometimes does. The apples tend to run small as the trees grow older.

Rhode Island Greening.—This is one of the fine old varieties which is gradually but surely losing favor for commercial uses. Color prejudice of consumers against green apples is the principal factor in causing this disfavor. The trees blight badly but generally are productive. The variety is one of the finest for most culinary uses. For special local markets, there may be a place for the variety, but it should be planted with discretion.

Stark.—Stark is an old variety of Ohio origin. The fruit of this variety is seriously affected by a number of diseases. The color of the fruit is poor, and the quality is below that of either Baldwin or Stayman. Miami, a red strain of Stark, is superior to the parent variety, but neither merits much consideration.

Sutton Beauty.—The fruit of this variety possesses many good qualities. Its quality is good; its color is attractive; and the fruit is very uniform in size. It matures a little earlier than Baldwin. The trees blight badly and are not very productive.

Tompkins King.—This old variety has been widely grown over Ohio almost from the beginning of Ohio orcharding. The fruit has good quality, but the tree, in addition to being seriously affected by blight, is a shy bearer. Apart from its value for show purposes or in the home orchard, it is not worthy of a place on the Ohio variety list.

Winter Banana.—When Winter Banana is well grown, it is of excellent appearance, but in spite of its blending of the rich yellow background with an attractive blush, it has become increasingly difficult to sell. The tree blights rather badly and is very subject to scab.

Winter Sweet Paradise.—This is a good late winter sweet apple. The addition of Sweet Delicious, which is a better apple, to the variety list somewhat modifies the need for Winter Sweet Paradise.

York Imperial.—This variety is of only mediocre quality as grown in Ohio, and there seems to be no good reason for planting it commercially in this State. The variety blossoms comparatively late, and where pollination of other late-blooming varieties is a problem, it might serve a good purpose. Colora, a red strain of this variety, except for color seems to be identical with the parent variety, being about the same size and characteristically lopsided in form. The color of Colora is a more solid red. Other red strains of York Imperial have not yet fruited at the Station.

Red Strains

Within recent years, many red strains of old well-established varieties have been introduced. Some of these red strains have to a considerable extent supplanted the original variety in newer plantings. A survey of 140 commercial applegrowers (3) in all sections of Ohio made in 1939 showed that heavy proportions of the red strains of Rome Beauty, Stayman Winesap, and Delicious were being planted in all areas of the State.

Investigations (5) made at the Station show that these red strains differ from the parent variety principally in color. Growers have occasionally reported that the fruit of some of these red strains may be smaller than that from trees of the parent variety. At the Station there has been no evidence of this. Such indices of maturity as pressure tests and sugar and acid content, as well as the quality of the fruit for dessert purposes, show that the red strains should be harvested at the same time as the parent varieties. Whether

or not the red strains should be planted instead of the standard varieties depends upon local conditions. Where difficulty has been encountered in growing apples of good color, growers may do well to shift to a red strain. At the Station, red strains of the following varieties have proved their merit: Delicious, Stayman Winesap, Rome Beauty, Northern Spy, Gravenstein, Jonathan, York Imperial, and Twenty Ounce. A number of these red strains have been briefly described in this bulletin.

Varieties Originated at the Ohio Agricultural Experiment Station

Franklin.—The outstanding variety which has been named is Franklin, a McIntosh × Delicious seedling. The fruits are medium in size, oblong-conic in shape, and attractively colored with bright carmine. On the unexposed cheek, the color is mottled and streaked, but on the surface exposed to the sun, it becomes solid, resembling somewhat that of a well-colored Delicious. The flesh is decidedly fine grained and mild in flavor, and the dessert quality is excellent. The picking date is approximately the third week in September; thus the variety follows McIntosh at Wooster. Its blooming season is late midseason. Franklin is suggested for trial as a dessert variety following McIntosh but preceding Jonathan and Delicious.

Warder.—Warder is a Rome Beauty open-pollinated seedling of medium size and high color also harvested late in September at Wooster. It is roundish-oblate in shape and is almost entirely overspread with a washed and splashed carmine. The flesh is mild, medium grained, subacid, and somewhat better in quality than that of Rome Beauty. It is late blooming and seems to bear very well. It is suggested for trial where a well-colored apple of the Rome Beauty type, but earlier than Rome Beauty, is desired.

CRAB APPLES

Only three varieties of crab apples are recommended for planting in Ohio—Dolgo, Transcendent, and Hyslop. These three varieties are probably the best, considering quality, and they ripen in succession over a period extending from mid-August to early September, the period when crabs are most in demand. A new crab apple which has recently fruited at the Station is the Flame. Although its fruit is too small for culinary purposes, this variety is extremely attractive. The tree is inclined to be dwarfish in growth.

Dolgo.—This variety originated in Russia and was introduced into America by Professor N. E. Hansen of the South Dakota Experiment Station in 1897. The tree is the most striking in appearance at picking time of any variety tried at the Station. The coloring of the fruit is a brilliant crimson and makes the tree very showy for a considerable distance. At blooming time also, the tree is very attractive. The fruit is rather small and very distinct in form, being rounding conic. The quality is good for culinary uses, and the variety is especially recommended for decorative purposes. May 4; August 10.

Hyslop.—This variety is perhaps the best of the crabs for commercial purposes, as it ripens in early September, when crab apples are more in demand. The trees are small and moderately vigorous. The fruit is of medium size and is pale yellow covered with dark crimson and overspread with a heavy bloom. May 4; September 7.

Transcendent.—Transcendent is one of the most beautiful of the crabs, both at blooming time and when the fruit is coloring. The fruit is of good quality and medium size. The tree is moderately vigorous, spreading, and productive. Although, like most crabs, it is subject to blight, it can be recommended as one of the best varieties. It ripens in late August, a little early to command the highest price. May 5.

PEARS

STANDARD VARIETIES OF AT LEAST LIMITED COMMERCIAL IMPORTANCE (IN ORDER OF APPROXIMATE HARVESTING DATE)

The following varieties are not to be taken as a recommended list for commercial planting, although all are grown in the State. Bartlett is still the principal variety of commercial importance in the pear-growing sections of northern Ohio, particularly in those close to Lake Erie. Kieffer is of secondary importance where a blight-resistant (but not immune) variety is desired above all other considerations. The varieties enumerated other than Bartlett are occasionally grown for limited retail trade within the State. The descriptions are the result of observations at Wooster.

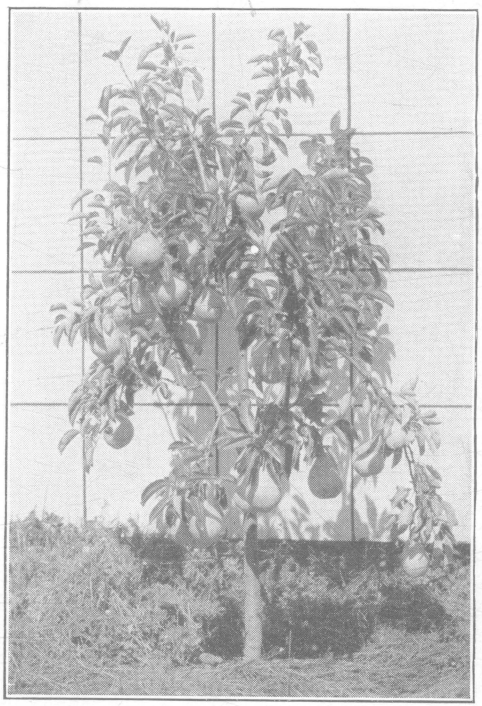

Fig. 5.—Dwarf tree of Bartlett pear producing crop of excellent large fruits, 1941

Tyson.—This variety, frequently called sugar pear, is the first summer sort which is grown even in a limited way in Ohio. The fruit, usually ripening about mid-August, is of small size but well flavored. As with all other early ripening pears, it must be disposed of at once in view of the rapidity with which the flesh becomes overmature.

Clapp Favorite.—This variety, ripening a week to 2 weeks ahead of Bartlett, is very susceptible to fire blight, and the fruits very quickly show core breakdown while the outer flesh is still firm. The fruits are large, attractive, and of excellent quality, but the variety has very limited value. Only the growers most experienced in controlling fire blight should attempt this variety, and then only on sites where the likelihood of blight infection from adjacent apple plantings is at a minimum.

Bartlett (fig. 5).—This is the best known and most popular variety for home and commercial use in the State. Unfortunately, during the last 5 years,

many trees have been killed by fire blight, and considerable dissatisfaction has arisen with the variety. There is, however, no resistant variety of equal dessert quality which can be recommended to replace Bartlett.

The trees should be grown in sod with nitrogen-carrying fertilizers applied only as needed to maintain moderate vigor. New plantings should be established by top-working on Old Home, a blight-resistant intermediate stock, now obtainable at some nurseries. The top-working should be carried out 18 or more inches from the main stem or trunk.

Bartlett requires abundant cross-pollination. No tree should be farther than two rows from its pollinizer. Seckel is ineffective as a pollinizer for Bartlett.

Gorham.—This is the best known and highest quality of the new varieties introduced by the New York Agricultural Experiment Station. Unfortunately, the trees are fully as blight susceptible as Bartlett, for which it would otherwise be an excellent pollinizer. The fruits are harvested 2 weeks later than those of Bartlett and are large in size, possessing an attractive yellow color associated with a fine russet irregularly placed over the surface of the fruits. The fruits are excellent for canning, as well as for dessert. The tree might well be grown along with Bartlett as dwarfs for home use in view of its excellent dessert quality, equal to that of Bartlett (fig. 6).

Seckel.—This is the well-known small sweet pear which is of excellent dessert quality but only very limited commercial value. The tree is very resistant to blight but is slow in coming into bearing. It becomes very productive, however. Worden Seckel, slightly larger in size, would seem preferable for planting where a fruit of this kind is desired.

Duchesse D'Angoulême (Angoulême).—This variety is grown for home use rather extensively in this State, but it lacks the dessert quality which would otherwise make it a desirable commercial variety. The tree is apparently less susceptible to blight than Bartlett. Its harvesting season is approximately 4 weeks later than that of Bartlett, for which it has been planted as a pollinizer.

Anjou (Beurré D'Anjou).—This variety, harvested approximately a month after Bartlett, has been grown only in a very limited way in Ohio. The trees are considerably more resistant to fire blight than Bartlett, but they frequently do not yield sufficiently good crops. Part of this difficulty may be due to inadequate cross-pollination and part to inheritance. The fruits are of excellent quality. The variety might well be planted as one of the pollinizers for Bartlett, but from a commercial viewpoint, its use in Ohio is probably restricted.

Bosc (Beurré Bosc).—This variety, from the point of view of size and quality of fruit, does well at Wooster. However, the trees are fully as blight susceptible as Bartlett and thus should be top-worked upon Old Home. The fruits are usually harvested in early to mid-October, 5 to 6 weeks after those of Bartlett, and are of excellent quality when properly ripened. The fruits will keep in cold storage at 32° F. for a considerable period of time, but they must be allowed to soften and ripen at a temperature of 60 to 65° F.

The trees are slow in coming into bearing but are reasonably productive thereafter when adequately cross-pollinated. Where a late pear of excellent dessert quality is desired and where adequate provisions for limiting fire blight are established, this variety is recommended both for home use and for limited commercial planting.

Fig. 6.—Branches of Gorham pear showing large, attractive fruits

Kieffer and Garber.—These varieties bear heavily, and this heavy bearing results in much small-sized fruit. Their quality is only fair and, therefore, their principal value is for canning where varieties of high dessert quality cannot be grown because of fire blight.

Lawrence.—This late pear is medium to small in size and not attractive. Although the fruits possess rather good dessert quality, all considerations point to eventual disappearance of the variety.

Recently, varieties reported to be blight resistant and to possess higher dessert quality have been recommended for trial. One of these, Waite, is now on trial.

NEW VARIETIES WORTHY OF TRIAL

The following varieties are not sufficiently outstanding to plant other than in a very limited trial. In general, insufficient evidence is available regarding their blight resistance.

Beierschmidt.—This variety originated in the Central West, where it is regarded as more hardy than standard pear varieties. The variety is in season with, or shortly after, Bartlett. The fruits are large, attractive, and of very good dessert quality, being somewhat sweeter than Bartlett. Beierschmidt should be given a trial by those who wish to extend the Bartlett season. Its blight resistance is one of the facts concerning the variety yet to be determined.

Cayuga.—This is a large-fruited Seckel seedling originated by the New York Agricultural Experiment Station. It has had a limited trial for some years. The fruits should be harvested about 3 weeks after those of Bartlett, but unfortunately at Wooster, premature dropping frequently begins several weeks before that date. A preharvest spray may largely prevent this premature drop. When the fruits are well grown and properly ripened, they are of excellent quality despite a rather thick, tough skin. The variety seems to be considerably more blight resistant than Bartlett.

Conference.—This variety and Bartlett are the standard English pear varieties. The fruits are harvested at Wooster 3 to 4 weeks after those of Bartlett. They are of medium size and have a fine russet frequently associated with a somewhat undesirable yellow-green ground color. Although the fruit is frequently unattractive, with proper ripening the yellow ground color becomes a decidedly attractive yellow. The fruits are of excellent dessert quality but do not keep long unless placed in cold storage. The trees seem to produce reasonably good yields but are apparently, like Bartlett, extremely susceptible to blight.

Ewart.—This variety, found near Akron, Ohio, is now propagated by the New York Fruit Testing Association. The fruits are harvested at Wooster about 2 to 3 weeks after those of Bartlett and are of large size and very good quality. They are greenish-yellow mottled with russet and become decidedly attractive when properly ripened. The blight resistance of this variety is yet to be determined.

Waite.—This variety, recently introduced by the United States Department of Agriculture, is reported to be outstanding in blight resistance and fairly good for dessert. The fruits resemble those of Bartlett in size and shape and have the season of Kieffer. It has been suggested that Waite be placed on trial to replace Kieffer.

NEW VARIETIES LITTLE KNOWN AS YET AND OLD VARIETIES OF LIMITED VALUE UNDER OHIO CONDITIONS

Clyde.—The fruits of Clyde are slightly larger than those of Seckel, of which it is a seedling. The fruits are somewhat similar in shape and color to Seckel fruits but show a greater amount of surface russeting. The fruits are of high dessert quality and are harvested somewhat after those of Seckel. The variety possibly deserves limited trial.

Cope's Seedless.—This variety is presumably a mutation of Bartlett, which it resembles somewhat in shape and appearance. It is no better than Bartlett in quality. The variety seems to be rather self-fruitful and apparently produces seedless pears when the flowers are self-pollinated and seeded fruits when they are cross-pollinated. The fruits are harvested somewhat later than those of Bartlett.

Dana Hovey.—This is a small-sized variety of high dessert quality suitable for home use. Its season is late.

Douglas.—The fruits are large, but the quality is not sufficiently high to warrant planting. Douglas seems to have little more value than Kieffer, of which it is presumably a seedling.

Flemish Beauty.—The fruits possess high dessert quality but are very susceptible to scab. The tree, furthermore, is very susceptible to fire blight. For these reasons, planting of this variety is questionable.

Laxton's Superb.—This is a seedling of Bartlett recently introduced from England. The fruits ripen earlier than those of Bartlett and, like those of other varieties preceding Bartlett, must be used at once. The fruits are of fine appearance and excellent dessert quality. This variety may deserve a limited trial.

Lincoln.—This variety has been planted because of its blight resistance, but its fruits are disappointing in size and color. They are harvested just preceding Bartlett and quickly break down. The fruits are of only fair quality, being too vinous unless very well ripened. There seems little justification for planting this variety except where blight resistance is the sole characteristic required.

Ovid.—The fruits of this late-harvested variety have not ripened properly at Wooster. It would appear that the variety has little promise under Ohio conditions.

Phelps.—This variety resembles Bartlett but has many bumps on the surface. The fruits are too acid and vinous for general approval. The season is 3 to 4 weeks after that of Bartlett.

Pulteney.—This variety hardly seems worth planting in Ohio. The fruits have a rather unattractive ground color and a more vinous flavor than is pleasing to most consumers. Frequently, the skin is astringent. The season is approximately 3 weeks after that of Bartlett.

Sheldon.—The fruits possess excellent dessert quality and are very attractive. Unfortunately, the tree is very susceptible to fire blight. The season is approximately 2 weeks after that of Bartlett.

Willard.—This variety is a late-harvested pear originated by the New York Agricultural Experiment Station. The surface of the fruits is uneven, irregular, and only fairly attractive. The fruits are large but as yet have not ripened properly at Wooster.

Winter Nelis.—This late variety has been grown only in a very limited way in Ohio for home use. The fruits are usually not attractive but do possess good dessert quality. Its planting is not encouraged, except where a late-harvested variety is desired for home use.

USE OF OLD HOME AS BLIGHT-RESISTANT INTERMEDIATE STOCK FOR PEAR VARIETIES

The best practice is to plant Old Home trees as a blight-resistant stock upon which to top-work standard commercial varieties after 2 or more years of growth. The result is a framework highly resistant to fire blight although the blight resistance of the scion variety is not improved thereby. The trees are vigorous and spreading and are readily budded or grafted to standard varieties. The top-working should be carried out on laterals 18 inches at least, and preferably more, from the trunk.

QUINCES

Quince culture in Ohio has the following important limitations: The demand for the fruits is severely restricted. The tree is very susceptible to fire blight. The oriental fruit moth causes widespread damage to the fruit. Black rot disease is very severe on quinces. Therefore, the fruit should be grown only where there is a reasonable chance of success in controlling the insect pests and plant diseases which are so prevalent on it in Ohio.

Two varieties only are grown in Ohio, Orange and Champion. Frequently these varieties are badly mixed.

Orange.—This is in reality the group name of the leading commercial quince in the United States. The fruits are nearly round, with a very short, thick neck and are harvested ahead of Champion. The flesh is pale yellow, tender, fine, juicy, mild subacid, and of very good quality. Wayne County Orange is presumably one of the examples of the type.

Champion.—The fruits of this variety are very large and resemble pears. Their flesh is particularly tender, delicate in taste, but firm, not spongy like that of Orange. The flesh is slightly astringent and is ranked good.

PEACHES

The tendency in Ohio at present is to select peach varieties in such a way that the ripening season for the peach orchard extends over a long period, and to emphasize varieties ripening earlier than Elberta. This trend has been brought about by the greater infestation of those later than Elberta by the Oriental fruit moth and by the good local demand for early peaches in some sections of Ohio. The recent development of earlier varieties which are firmer and of higher quality than those grown previously has encouraged the greater use of early varieties. An effort is also being made by fruit breeders to introduce varieties which are of high quality and more hardy in flower buds than Elberta.

The following lists of recommended varieties are intended to be used as a guide only, since no list could be applicable to every Ohio grower. The recommended varieties are divided into two groups: standard varieties and varieties recommended for special purposes or locations. Another group is composed of the newer varieties which seem to have merit in Ohio but about which sufficient information is not available either to recommend or discard them. In each group, the varieties are listed in order of ripening date.

STANDARD COMMERCIAL VARIETIES

The following peach varieties are suggested as standard for general commercial plantings in Ohio:

Golden Jubilee.—This variety is an early yellow freestone ripening about 3 weeks before Elberta and is of that type. It is of medium to large size, and its shape is similar to that of Elberta. Its quality is superior, however, and it is more hardy in wood and flower bud. Although this variety lacks as much firmness of flesh as sometimes desirable and as is present in some of the more recent introductions for that season, it still seems preferable because of its hardiness of flower bud in Ohio. The fruits are well colored and attractive. They are especially well suited to local trade and roadside stands. The trees should be thinned early and well in order to obtain desirable size and avoid flat-shaped fruits.

Cumberland.—This has been a profitable early white freestone peach in Ohio. The fruits are medium to large in size, and the quality is good. The flesh is firmer and of better quality than that of Carman, with which it ripens. The flower buds are relatively hardy to low winter and spring temperatures.

South Haven.—A large, yellow peach, South Haven is a true freestone during most seasons. It is round, only moderately firm, and productive. The flower buds are hardy, but the wood is relatively tender to low winter temperatures. South Haven has been a profitable variety in Ohio but is being rapidly replaced by Halehaven, which is firmer, more free of stone, and of higher color.

Halehaven.—This is an attractive, yellow freestone of good size and quality which is rapidly becoming an important variety. It is preferable to the older South Haven, to which it is similar. The Halehaven has more color, firmer and richer flesh, and more freedom at the stone than South Haven. Evidently it is about the same in hardiness of flower bud. Halehaven was introduced by the South Haven, Michigan, Experiment Station and is one of the most outstanding varieties introduced in recent years. The trees are vigorous and productive but require detailed thinning of the fruits in order to obtain satisfactory size. Halehaven ripens 2 weeks before Elberta and is recommended for that season for commercial, local market, and home use in Ohio.

Belle (Belle of Georgia).—This is a hardy, white-fleshed freestone peach of medium to large size and good quality. It ripens a few days before Elberta and is preferred by many for a commercial planting of white peaches of that season. Its shape is similar to that of Elberta, but it is not so large. It is usually more free at the stone and firmer than Champion; hence, though it lacks the size and quality of Champion, it is often preferred to that variety. It ripens during the latter part of the Champion season.

Early Elberta.—Early Elberta is a yellow freestone similar to Elberta except that it is a few days earlier, slightly smaller, and more compressed in shape. It is fairly firm and of better quality than Elberta. The trees are productive, but, like those of Elberta, the flower buds are relatively tender to low winter temperatures.

Elberta.—A large-size, yellow freestone, Elberta is by far the leading peach in Ohio. Its popularity is due to its large, firm, attractive fruit, vigor of trees, suitability to many soil and climatic situations, and to its being so well known. The fruit quality is usually only fair, and the flower buds are

tender to low temperatures. It should still be considered an important commercial variety, but it is being replaced in many orchards by varieties of higher quality and greater hardiness.

Salberta.—A yellow freestone, similar to Elberta, Salberta ripens a little more than 2 weeks later. It is one of the best peaches of that season for Ohio, although it lacks as much hardiness as desirable, since it is only about as hardy as Elberta.

SPECIAL-PURPOSE VARIETIES

In addition to the preceding standard commercial varieties, the following varieties are recommended for special purposes for certain localities or to extend the season.

Mayflower.—This variety is a small, round clingstone with white flesh. The only important recommendation for this variety is its earliness. It ripens about 2 weeks before Mikado, or approximately 7 weeks before Elberta.

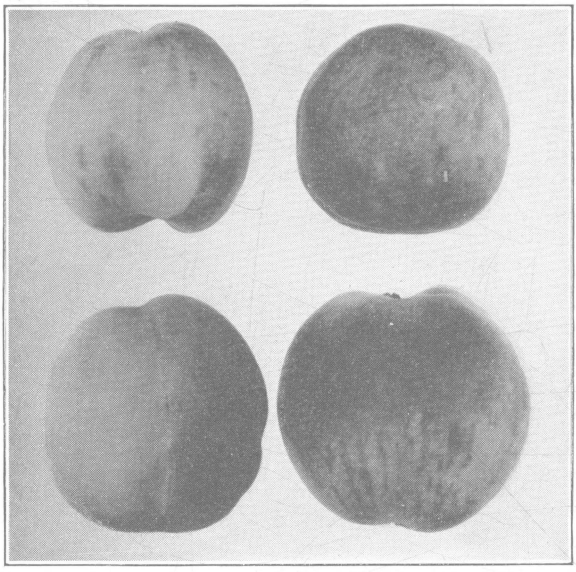

Fig. 7.—Two very hardy early peach varieties: Top, Marigold, Bottom, Mikado

Mikado (June Elberta).—This is a very early, yellow, semi-clingstone variety of fair to good quality (fig. 7). It is medium in size when thinned early and to 6 or 7 inches apart on the tree. Mikado is hardy in flower bud, and the tree is vigorous and productive. The fruit lacks firmness but is desirable for home use and sometimes for local or roadside trade. Mikado has sterile pollen and, therefore, requires cross-pollination.

Marigold.—Marigold is a yellow, semi-freestone of medium size (fig. 7). It has soft flesh that is of fair quality. Marigold is moderately productive, and its flower buds are hardy to low temperatures. It ripens about 10 days before Golden Jubilee and is thus of some value to extend the season for home or local market purposes.

Redhaven.—An early, yellow freestone of medium size recently introduced by the Michigan Experiment Station, Redhaven has dark red, tough skin. Its quality is good, and its flesh is exceptionally firm for a peach of that season. It ripens about a month before Elberta. This is a very promising peach for early markets in Ohio.

Carman.—This variety is a white semi-freestone, almost round in shape, and of medium size. The flesh is very soft and of fair quality for eating fresh but poor for canning. Both the flower buds and wood are very hardy to low winter temperatures. It is a productive variety but has been overplanted.

Rochester.—This is a yellow freestone variety that is round, medium in size, and fuzzy. The flesh is firm and of rich quality. Both the tree and the flower buds are very hardy. It requires careful pruning and thinning in order to secure satisfactory yields of good-sized fruit. Rochester has been a valuable peach in some parts of Ohio because of its hardiness, ripening season, and quality.

Goldeneast.—A New Jersey introduction, Goldeneast is yellow, large, attractive, and of good quality. It would be a good variety to follow Golden Jubilee in Ohio if the flower buds were a little more winter hardy in this State.

Vedette.—This is a Canadian variety which is an attractive yellow color, freestone, and medium to large in size. It is almost round, firm of flesh, and of very high quality. Vedette has been fairly hardy and only fairly productive.

Valiant.—This variety is a yellow, medium- to large-sized freestone of very good quality. Its flesh is not as firm as is most desirable but is of a very attractive light yellow color. The trees are fairly productive, and this variety would probably be grown much more except that there are so many other good varieties at that season (about 10 to 12 days before Elberta).

Veteran.—Another Canadian variety which is medium in size, round, and high in quality, Veteran has flesh which is of an attractive yellow color but which tends to cling slightly during some seasons.

Redelberta.—A medium-sized, yellow, freestone peach, Redelberta has a rich flavor and good color. Limited tests indicate that it is probably not extremely hardy. It is similar to Elberta in shape and ripens about midway between Halehaven and Elberta. For a peach of that season, it seems promising for the local market trade.

Eclipse.—Eclipse is a yellow freestone of the Elberta type which ripens about a week earlier than Elberta. The quality is good and the flesh is fairly firm. Eclipse is one of the hardiest varieties, both to low temperatures during the winter and to cold weather during the blooming season. Sometimes this variety lacks sufficient size of fruit, but it is well worthy of a trial where hardiness is a major factor and where a peach ripening at this season is desired.

Champion.—This is a standard, large, round, white semi-freestone of very high quality. During some seasons it can be classified as a true freestone. The flesh is tender and juicy and only medium firm. Champion is a very hardy variety, both in wood and in flower bud. Because of its high quality and hardiness, it is valuable, especially for the home and local market.

Primrose.—A yellow peach of medium size and good quality, Primrose ripens 3 to 4 days before Elberta. Neither the buds nor the wood is very hardy to low winter temperatures.

Shipper's Late Red (Big Red).—This is a large, yellow, freestone peach of fair to good quality ripening during the latter part of the Elberta season. In

the central and southern parts of the State, it is sometimes preferable to the Elberta because of its higher color and quality. It is evidently similar to Elberta in being tender to low temperatures, although during some winters it has seemed slightly more hardy.

J. H. Hale.—A well-known peach of large size and high quality, J. H. Hale has fruits which are attractive and firm. Unfortunately, it is more popular with the consumer than with the grower. It is often not very productive; the flower buds and wood are both tender to low temperature; the trees are small; and the flowers are self-unfruitful. Because of these factors, the J. H. Hale is often not profitable to the grower even though he may obtain a premium for it over the Elberta. Some growers, however, have found the variety profitable when low winter temperatures are not of prime importance, and where it is interplanted closely with other varieties for pollination.

Fertile Hale.—A yellow freestone which resembles Elberta more than the J. H. Hale, Fertile Hale ripens just after Elberta and is evidently a little more hardy in flower bud. The flowers produce fertile pollen, and the trees are productive and vigorous.

Gage Elberta.—This variety is very similar to Elberta except that the trees are not quite so vigorous and are more spreading, with wider crotches. It is evidently fairly resistant to bacterial spot.

Oldmixon.—A white, freestone peach of only medium size, Oldmixon is not very firm and has tender skin. It should be considered only as a home or local market peach.

Hope Farm.—A medium to large, white, freestone variety of good quality, Hope Farm follows Elberta in season. It has tender skin and will not stand hauling. The trees are productive and fairly hardy, and the flowers appear slightly later than those of most varieties. It is evidently self-unfruitful; hence, it should be planted with another variety or varieties for pollination.

Wilma.—This is a large, yellow freestone of the Elberta type. Many prefer this variety for canning. It is of medium to large size, firm, and usually preferred to Elberta in quality. Both the flower buds and the wood are tender to cold; hence, it should be used only in the Lake region, or where cold is not a major factor.

Williams Cling.—This is a medium- to large-sized clingstone variety. There is sometimes a demand for a limited number of cling peaches for pickling, and this variety usually fills the need for a peach of that type in Ohio.

Lemon Free.—A yellow freestone of medium size and fair to good quality, Lemon Free is firm and well liked by many for canning, although the flesh is sometimes rather dry. Lemon Free often ripens unevenly, is only fairly productive, and is fuzzy. It is slightly more hardy than Elberta and ripens about 16 days later.

Heath Cling.—This is a large, white-fleshed, clingstone variety of fair quality for which there is a limited demand for pickling in Ohio.

Salwey.—Salwey is a yellow, medium-sized freestone of fair quality. The flower buds are similar to those of Elberta in hardiness. It ripens more than a month later than Elberta. Salwey is not planted in Ohio as much as formerly, but it is still suggested for a variety of that season. There is little demand for peaches at that time; the fruits often fail to ripen well; and they may also be wormy.

Krummel (Krummel October).—A very late, yellow freestone of medium size and fair quality, Krummel often fails to ripen well in Ohio and is sometimes injured by low temperatures.

NEW VARIETIES OF MERIT

The following brief descriptions are of some of the newer peach varieties which now seem promising in Ohio but whose commercial value is yet uncertain.

Erly-Red-Fre.—This variety is a well-colored, attractive, early, white-fleshed peach of large size. Its flesh is almost free, moderately firm, and of fair to good quality.

Raritan Rose.—A white-fleshed freestone introduced by the New Jersey Experiment Station, Raritan Rose is attractive and firmer in flesh than Cumberland, with which it ripens. The trees seem vigorous and productive, but this variety has not been tested long enough to determine the hardiness of its flower buds to low temperatures.

Triogem.—A yellow, attractive, well-colored freestone ripening just after Golden Jubilee and during the latter part of the Jubilee season, Triogem has a high quality and firm flesh. It is medium to large in size and of high color. It would probably be suggested to replace Golden Jubilee if it were as hardy in flower bud.

Early Halehaven.—Evidently this peach originated as a sport on a Halehaven tree. It is similar to that variety but slightly smaller and ripens approximately 7 days earlier, with Golden Jubilee.

Golden Globe.—A large, yellow freestone from the New Jersey Experiment Station, Golden Globe has round, attractive, moderately firm fruit of good quality. Evidently the flower buds are tender to low winter temperatures; otherwise it would be a promising commercial variety for Ohio.

July Elberta.—A large, yellow freestone of good quality, July Elberta is medium to large in size and has firm flesh. It ripens with Halehaven and has not been as hardy or as attractive as that variety at the Ohio Agricultural Experiment Station. Limited tests here indicate that although the July Elberta is a desirable peach, it cannot be recommended in place of Halehaven.

Colora.—A new yellow peach of good size and high color which is very hardy in flower bud is Colora. The fruit has a rough shape, and the quality has been only fair at the Ohio Station. It is usually a freestone and has bright yellow flesh that is fairly firm. The outstanding merit of this variety as seen in Ohio has been its hardiness, which is evidently similar to that of such varieties as Rochester and Greensboro.

Red Rose.—This is an attractive, white-fleshed freestone of high quality. The flower buds seem hardy in limited tests, and it is suggested for trial where a white variety ripening between Cumberland and Belle is desired.

Midway.—A medium- to large-sized, yellow freestone of good quality ripening just after Halehaven, Midway is suggested for trial for that season.

Zarn.—This variety originated in northern Ohio and is ripe about 10 days before Elberta, to which it is similar. Like Elberta, it lacks hardiness, but where this is not a prime factor, Zarn has been valuable for that season.

Sungold.—A large, yellow freestone of large size ripening just before Elberta, Sungold is almost round in shape and of good quality. Its flesh is fairly firm. The flower buds seem hardy, and the trees at the Station have been productive. It seems well worthy of more extensive trial.

Kalhaven.—This variety is a yellow freestone ripening just ahead of Elberta. The flesh is firm, and the skin fairly thick. It is of fairly good quality. It is of medium to large size and almost round in shape but somewhat rough. Its relative hardiness has not been determined.

Candoka.—A large, yellow freestone which has very little fuzz is Candoka. It is round in shape and has firm flesh. It ripens with the J. H. Hale and is somewhat similar to that variety but has not been as large at the Ohio Station. The Candoka has been tender to low winter temperatures, both in wood and in fruit bud. It has sterile pollen.

Hal-Berta Giant.—This is a large, yellow, freestone peach which closely resembles J. H. Hale.

Welcome.—Welcome is a large, round, yellow-fleshed peach of good quality ripening during the latter part of the Elberta season. It lacks the size of J. H. Hale, but the trees usually yield higher and are more vigorous. It has been a little more hardy than the J. H. Hale and Elberta at the Ohio Station.

White Hale.—This variety resembles the J. H. Hale in size of fruit and ripens with that variety. It is firm and very attractive. It has white flesh, however, and fertile pollen. The trees have been more vigorous than those of the J. H. Hale, and it is suggested for those who want a white peach ripening at that season.

TABLE 3.—Some characteristics of peach varieties at Wooster, Ohio
(Listed in approximate order of ripening)

Variety	Color of flesh	Size	Quality	Approximate ripening date	Principal use
Mayflower	White	Small	Fair	July 16	Home
Mikado	Yellow	Medium	Fair	July 30	Home and local market
Buttercup	Yellow	Small	Fair	August 2	Home and local market
Marigold	Yellow	Medium	Fair	August 4	Home and local market
Arp (Arp Beauty)	Yellow	Medium	Fair	August 4	Home
Greensboro	White	Medium	Fair	August 6	Home and local market
Erly-Red-Fre	White	Large	Fair	August 7	Home and local market
Redhaven	Yellow	Medium	Good	August 9	Commercial and local market
Oriole	Yellow	Medium	Fair-good	August 11	Local market
Raritan Rose	White	Medium-large	Good	August 13	Commercial and local market
Cumberland	White	Medium-large	Good	August 14	Commercial
Golden Jubilee	Yellow	Large	Good	August 15	Local market
Triogem	Yellow	Large	Good	August 17	Commercial
Carman	White	Medium	Fair	August 17	Local market
Rochester	Yellow	Medium	Fair	August 19	Commercial
Early Halehaven	Yellow	Medium	Good	August 20	Local market
Golden Globe	Yellow	Large	Good	August 21	Commercial
Goldeneast	Yellow	Large	Good	August 23	Commercial
Vedette	Yellow	Medium	Very good	August 23	Home and commercial
South Haven	Yellow	Large	Good	August 25	Local market
July Elberta	Yellow	Large	Good	August 26	Local market
Halehaven	Yellow	Large	Good	August 27	Home, commercial, and local market
Colora	Yellow	Large	Good	August 28	Local market
Zarn	Yellow	Large	Fair-good	August 29	Commercial and local market
Valiant	Yellow	Medium-large	Good	August 29	Local market
Hiley	White	Medium-large	Good	August 30	Local market
Veteran	Yellow	Medium	Very good	September 1	Local market
Redelberta	Yellow	Medium	Good	September 2	Commercial and local market
Eclipse	Yellow	Medium-large	Good	September 2	Local market
Champion	White	Large	Very good	September 3	Commercial and local market
Early Elberta	Yellow	Large	Good	September 6	Commercial
New Prolific	Yellow	Medium	Good	September 6	Commercial

TABLE 3.—Some characteristics of peach varieties at Wooster, Ohio—continued

(Listed in approximate order of ripening)

Variety	Color of flesh	Size	Quality	Approximate ripening date	Principal use
Primrose	Yellow	Medium-large	Good	September 6	Commercial
Belle (Belle of Georgia)	White	Medium-large	Good	September 6	Commercial
Sungold	Yellow	Large	Good	September 7	Commercial
Kalhaven	Yellow	Large	Fair-good	September 7	Commercial
Elberta	Yellow	Large	Fair	September 9	Commercial
Shipper's Late Red	Yellow	Large	Fair-good	September 10	Commercial
Candoka	Yellow	Large	Good	September 10	Commercial
J. H. Hale	Yellow	Very large	Very good	September 10	Commercial
Hal-Berta Giant	Yellow	Very large	Very good	September 10	Commercial
Welcome	Yellow	Very large	Good	September 11	Commercial
Fertile Hale	Yellow	Large	Good	September 11	Commercial and local market
Gage Elberta	Yellow	Large	Fair-good	September 11	Commercial
White Hale	White	Very large	Good	September 11	Commercial
Gary	Yellow	Large	Fair-good	September 12	Commercial
Oldmixon	White	Small-medium	Good	September 12	Home and local market
Kette	Yellow	Large	Fair-good	September 13	Commercial
Hardee	Yellow	Medium-large	Fair-good	September 14	Commercial
Rio-Oso-Gem	Yellow	Large	Good	September 14	Commercial
Hope Farm	White	Medium-large	Good	September 14	Home and local market
Wilma	Yellow	Large	Good	September 15	Commercial
Kalamazoo	Yellow	Medium-large	Fair-good	September 16	Commercial
Crosby	Yellow	Medium-large	Fair-good	September 16	Commercial
Gold Drop	Yellow	Medium	Good	September 21	Commercial
Williams Cling	Yellow	Medium-large	Fair-good	September 23	Commercial
Banner	Yellow	Medium-large	Fair-good	September 24	Commercial
Lemon Free	Yellow	Medium	Fair-good	September 25	Commercial
Salberta	Yellow	Large	Fair-good	September 25	Commercial
Smock	Yellow	Medium	Fair	October 1	Commercial
Heath Cling	White	Medium-large	Fair	October 12	Home and commercial
Salwey	Yellow	Medium	Fair	October 17	Commercial
Krummel	Yellow	Medium	Poor-fair	October 24	Home and commercial

Rio-Oso-Gem.—This is a large, firm, yellow freestone of good quality, similar to J. H. Hale in shape but not so uniform, as grown at the Station. Evidently the pollen of this variety is fertile. The trees are not so vigorous as those of Elberta, but evidently more so than those of J. H. Hale. Both the flower buds and the wood have been tender to low temperatures in Ohio.

Gary.—An Elberta type of peach ripening just after Elberta, Gary seems similar in all respects except for date of ripening.

Afterglow.—This is a large, yellow freestone ripening just after Elberta. Limited tests indicate that because of greater flower bud hardiness, it may be preferable to Wilma for prolonging the Elberta season.

Kette.—This variety is similar to Elberta in many respects but ripens a few days later. It has been of better color and quality than Elberta at the Station.

Hardee.—Hardee is a yellow freestone of the Elberta type with medium to large fruit. In shape it is more compressed than Elberta. Hardee ripens during the latter part of, and just after, the Elberta season. The trees lack the vigor of Elberta but are not so dwarf as those of J. H. Hale. The Hardee has been hardier than Elberta both in flower bud and in wood during several seasons and in different locations in Ohio.

SIZE AND COLOR OF BLOSSOMS

It is often desirable to know the size and color of blossoms of peach varieties. Some varieties have such large, showy blossoms that they are used for ornamental purposes, as well as for their fruit. A knowledge of the size of blossoms is also sometimes valuable in distinguishing between varieties. A classification of size and color of blossoms of several varieties, including some of the newer ones, is, therefore, given.

Peach varieties having large pink blossoms:

Alton	Florence	Morrow
Bilyeus	Greensboro	Radiance
Buttercup	Hardee	Rio-Oso-Gem
Carman	Krummel	Rochester
Cumberland	Lemon Free	Salwey
Early Elberta	Marigold	Vedette
Eclipse	Maxwell	Veteran
		Wilma

The Heath Cling has small pink blossoms.

Peach varieties with medium to small reddish blossoms:

Banner	Gary	Kalamazoo
Smock	Golden Jubilee	Licking
Belle	Gold Finch	New Prolific
Brackett	Hal-Berta Giant	Oldmixon
Candoka	J. H. Hale	Oriole
Champion	Halehaven	Pioneer
Elberta	Harpole	Primrose
Fertile Hale	Heidelberg	Salberta
Fitzgerald	Hope Farm	Shipper's Late Red
Gage Elberta	July Gold	South Haven
		Valiant

NECTARINES

The outstanding difference between peaches and nectarines is the lack of fuzz on the fruit of the latter. Although they may prove valuable for the home orchard, roadside stand, or for special markets, the commercial value of nectarines in Ohio is limited. The best varieties from the standpoint of size and quality are not hardy enough for this State. Following is a brief description of a few which seem of most value here:

Goldmine.—A white-fleshed, semi-freestone nectarine, Goldmine is round and medium to small in size. It is soft and sweet. Goldmine has large pink blossoms.

Hunter.—This variety is a yellow freestone which is tart but pleasing in flavor and medium to small in size. It has large pink blossoms.

Quetta.—Quetta is a white-fleshed clingstone. It is almost round in shape and has an attractive color. This variety is large in size for a nectarine.

Sure Crop.—A white freestone of desirable quality, Sure Crop is round or nearly so and of medium size. It seems above average in hardiness. The blossoms are large and pink.

APRICOTS

The planting of apricots is not recommended in Ohio. The superior varieties of the West are not well adapted to this State. The blossoms of apricots are usually destroyed by late spring frosts in Ohio. Some recent introductions are promising but cannot be recommended yet.

CHERRIES

Both sweet and sour cherries are grown commercially and for home use in Ohio. There are relatively few important varieties, however.

The common sour cherries are classified into two groups. Those with pale or colorless juice are called amarelles, of which the Early Richmond and Montmorency are examples. Those with dark red juice and usually dark fruits are called morellos; the English Morello and Wragg are typical examples.

The sweet cherries are sometimes divided into the heart, or soft-fleshed, types, such as the Governor Wood, and the bigarreau, or firm-fleshed, types, such as the Windsor and Napoleon. The bigarreau varieties are usually preferable.

The duke cherries are hybrids and have characteristics which are between those of the sours and the sweets. The early flowering dukes can be pollinated by sweet cherries; those flowering late are often pollinated by sour cherries.

SOUR

The following sour cherry varieties are listed in order of ripening:

Dyehouse.—A very early, light-colored cherry of fair quality and small size, Dyehouse is recommended for use only when a very early variety is desired.

Early Richmond.—This variety ripens just after Dyehouse and is light colored with almost colorless juice. The fruits are small and of only fair quality at their best. Early Richmond is suggested only as a variety to precede Montmorency, although many who have it feel that it is not helpful to their trade because of its lack of high quality.

Montearly.—Montearly is a new variety ripening soon after Early Richmond at Wooster. The fruit is medium in size and of good quality. The juice is dark colored and rich flavored. The trees seem vigorous and productive in limited tests at Wooster.

Richmorency.—This is a medium-sized, light-colored cherry ripening before Montmorency. It is a new variety which has not been tested extensively in Ohio.

Montmorency.—This variety is recommended as the standard commercial sour cherry in Ohio. Many successful growers prefer to use only the Montmorency in their orchards. Its fruits are large and of good quality, and its trees are vigorous and productive when grown correctly in good orchard soils.

English Morello.—This is the most common variety of the morello type. It ripens late and has dark red juice and fruit. The trees are dwarf growing, and this is of some advantage for the home or garden planting. The juice is

high in sugar content, but it is also very high in acid, which gives it a sour flavor. The English Morello is preferred by many for pies, and the juice is used considerably in blending. This variety, and others of this type, are not recommended generally, however, because they are subject to leaf spot and are low yielding, and often there is only a limited demand for the fruit.

SWEET

There are several limitations to growing any of the sweet cherry varieties in Ohio. Among them are: difficulty in starting trees, injury to blossoms from spring freezes, cracking of the fruit, brown rot, and loss of fruit from birds. It should be remembered that all sweet cherry varieties are self-unfruitful. It is, therefore, necessary to plant different varieties near enough to each other that the pollen can be transferred from one to another. Three common varieties, Bing, Lambert, and Napoleon, are cross-unfruitful; hence, some other variety must be planted with them.

Windsor has been the most dependable sweet cherry in the Station orchards. Although it lacks the size and quality of Bing, it seems preferable as a commercial variety, since it is less subject to cracking and rotting. Lambert has also been a good dark variety. Napoleon is probably preferable among the light-colored sweet varieties. Victor is a light-colored new and promising one which ripens before Napoleon. The varieties are listed here in approximate order of ripening, although there is no appreciable difference during the main picking season.

Seneca.—Seneca is a very early variety of medium size. Its skin is dark, and its flesh is soft and juicy. Its flavor is good. This would be a good variety to extend the season, but usually the fruits are largely destroyed by birds. June 10.

Early Rivers.—This is a black cherry of medium size and good quality. Its flesh is firmer than that of Seneca but not as firm as that of the later varieties, such as Bing. It is useful mainly to extend the season. June 14.

Governor Wood.—An early variety with pinkish-yellow skin and soft flesh, Governor Wood has fruit that is small to medium in size. The tree is vigorous and productive. Because of its ripening date, the fruits of this variety are often subject to damage by birds. June 21.

Black Tartarian.—This variety is a purplish-black cherry which is soft fleshed, juicy, and of good quality. The tree is vigorous and upright. Its principal use is to lengthen the season for local sales. June 23.

Victor.—Victor is a pinkish-yellow variety with firm flesh ripening later than Governor Wood and before Napoleon. It is medium to large in size, and the trees yield well. June 27.

Bing.—A very dark red to black variety of firm flesh and high quality, Bing is one of the most attractive when fully ripe but often cracks open and rots before this stage is reached, especially in moist seasons. The trees are relatively small and have not produced as well as Lambert or Windsor at Wooster. July 1.

Napoleon (Royal Ann).—This is a commonly grown cherry which is yellow with a pink or red blush. The fruit is large with firm flesh and high quality. The fruit is subject to rotting and cracking if not well sprayed, but not as much so as Bing at Wooster. The trees are vigorous, productive, and relatively hardy. July 3.

Yellow Spanish.—This is a yellow cherry with pinkish blush. The flesh is firm and of good quality. The fruit is not so large or so attractive as that of Napoleon, but the flower buds and wood have been more hardy at the Experiment Station. July 3.

Lambert.—Lambert is a large, dark red cherry with firm flesh. The trees are vigorous and very productive. Its fruit is subject to cracking in Ohio, but Lambert should be considered one of the standard varieties. July 5.

Windsor.—This has been one of the best varieties at Wooster, as well as for many growers in the State. The skin is dark red; the flesh is firm; and the trees have been very productive. The fruits are not so subject to cracking as those of Bing or Lambert, but they are not so large or quite so attractive. The trees are fairly hardy and long-lived. July 5.

Schmidt.—This cherry has dark red skin, firm flesh, and large size. The trees become especially large but sometimes do not produce in proportion to their size. The fruit is very attractive, and Schmidt is one of the leading varieties in some cherry-producing regions. July 5.

DUKE

Brassington.—A medium-size cherry which has more of the sweet cherry characters than the sour, Brassington ripens during, or soon after, the sweet cherry season. Many like it for pies. The fruits are red, subacid, and juicy. The tree is rather weak and not highly productive.

Reine Hortense.—This is a light red duke cherry of large size and high quality for pies. The flesh is soft and juicy. The trees are more vigorous and productive than those of Brassington, but they, too, tend to break easily when the fruit is picked. Probably Reine Hortense is preferable to any of the dukes, but it is sometimes not highly productive.

Royal Duke.—This is one of the latest and also one of the most productive of the dukes. The fruits are medium to large, round, dark red, and liked by many for pies. The trees are not as strong as desirable, and the branches break easily.

PLUMS

The plum varieties grown in Ohio can be divided in general into the following groups: The Japanese plums (*Prunus salicina*), the large European (*P. domestica*), and the Damson (*P. domestica institia*). Most of the common plums and prunes are in the European group.

JAPANESE

The Japanese plums blossom early and are thus more subject to spring freezes than the European and Damson plums. Varieties in this group are soft and susceptible to rot but are grown to some extent for eating out of hand. They are sometimes useful for extending the plum season, as they ripen early, and some of them are very attractive. Probably the best of these for Ohio planting are (in order of ripening): Shiro (August 3), Santa Rosa (August 7), Abundance (August 12), and Burbank (August 17). The Shiro has yellow skin and yellow flesh; the Abundance has red skin with yellow flesh; and the Burbank has dark red skin and light red flesh. The Santa Rosa is purple with red flesh. None of these varieties should be grown alone, as they are self-unfruitful and require cross-pollination.

EUROPEAN

The prune plums are preferable in this group for Ohio planting. Prunes may be defined as plums which are capable of being dried with the seed without fermentation. They are high in sugar content, and their flesh is usually firm. Only plums or prunes of high quality should be offered for sale if the demand for this fruit is to be developed. There has been a definite improvement in varieties, as well as market demand, for this fruit in recent years.

The following brief descriptions are arranged in order of ripening as far as possible:

Bradshaw.—This is an old plum variety but is still one of the leading ones in Ohio. The trees are slow growing and come into bearing late but are long-lived and produce well once they have started. The blossoms open late and thus sometimes avoid late frosts. The fruit is reddish-purple, of fair to good quality, and soft. The stone is usually completely free when the fruit is mature. The Bradshaw ripens early and is preferred by many for canning or butter. September 5.

Imperial Epineuse.—This is a semi-freestone prune plum of very high quality. The appearance of the large, reddish-purple fruit is only fair; hence it often does not sell well until it is known. After that there is likely to be a good demand. The trees are well shaped and fairly vigorous but usually do not bear well until they are 8 to 10 years old. They are long-lived, however, and bear regular and heavy crops after this age. Recently, when a plum variety orchard at the Station was removed at 28 years of age, an Imperial Epineuse tree had been leading all the rest in yield for several years. September 10.

Stanley.—An attractive blue prune plum which is being used extensively in new plantings in Ohio, Stanley is a medium to large, freestone fruit ripening in midseason. The flesh is greenish-yellow, firm, and of high quality when well grown and mature. The trees bear much younger than the Italian and German prunes and are relatively hardy in both wood and flower bud. The Stanley is recommended as a standard commercial variety for Ohio. September 11.

Italian Prune (Fellenberg, York State).—This variety has been used extensively for commercial orchards in Ohio. It seems preferable to the German Prune because of the more desirable tree and because it comes into bearing a little earlier. The fruit is usually larger than that of the German and of better quality. Its attractive blue color, freedom at the stone, and firm flesh make this variety a good one for local or other sales. September 15.

German Prune.—There are evidently several strains of this variety, some of which are very good and others quite undesirable. In general, the trees are upright, vigorous, and slow in coming into bearing. The fruits are an attractive blue, freestone, medium to large in size, firm, and of high quality. The German Prune has long been grown extensively in Ohio, and many growers feel that it has been their most profitable variety. It is well known by consumers and buyers and, hence, is demanded extensively on the market. September 16.

Hall.—This is a large, attractive, blue, semi-freestone plum with firm flesh and very high quality. It would be one of the most desirable plums for commercial planting in Ohio except for its lacking in hardiness of wood and flower buds. It should be grown more extensively in the State where hardiness is not a major factor with plums. September 18.

Albion.—Albion is a promising late variety. It resembles Grand Duke but seems preferable because of its higher quality. It bears relatively early although not so early as Stanley. September 28.

Reine Claude.—This variety seems to be one of the best of the green-gage type. The fruit is medium to large sized, round, semi-freestone, greenish-yellow, and of high quality for dessert or canning for those who like the soft, juicy flesh. The trees are only moderately vigorous but produce regularly and fairly well. The Reine Claude is recommended in Ohio principally for local or home sales. October 6.

Shropshire.—Although the Shropshire is lacking in the size and quality of the French damson, it seems preferable in Ohio because of its more vigorous and long-lived trees, as well as the more consistently high yields. The Shropshire is well liked for jelly, jams, and preserves, and the principal market for it is in southern Ohio. The fruits are small and blue, and their flavor is tart.

GRAPES

Only the American type grapes are hardy enough to grow and produce well in Ohio. Some of the best of the new varieties, however, are results of attempts by breeders to develop hardy varieties with some of the qualities of the European type. The following descriptions of grape varieties include the standard, as well as some of the most promising new, varieties for Ohio. They are listed in approximate order of ripening. A list of standard commercial varieties for general planting in Ohio includes Portland, Fredonia, Worden, Niagara, Delaware, Concord, and Catawba. (Commercial plantings of Catawba should be limited to the Lake region.)

Seneca.—Seneca is a white variety ripening 2 to 3 weeks before Niagara and is similar to European type grapes in flavor. It has lacked hardiness and productiveness as grown at the Ohio Agricultural Experiment Station.

Portland.—This variety has been the most satisfactory of the early white varieties at the Experiment Station. It ripens about 3 weeks before Niagara and is of very high quality. Its principal value lies in its season, and it is suggested for a light-colored variety to precede Niagara. Portland should be picked as soon as it becomes ripe, as it does not remain in good condition long afterward.

Brocton.—Brocton is another white variety which ripens after Portland and Seneca. It is very high in dessert quality. Brocton has been relatively tender both in bud and wood at this Station. It may be tried for home plantings.

Fredonia.—This is a Concord type grape that ripens 3 weeks earlier than Concord. Its clusters and berries are usually about the size of Concords, and the plants are seemingly as hardy and productive as Concord. The juice is deeper colored and preferred by many to that of Concord. Fredonia is no longer a new, untried variety and is suggested for planting where an early dark grape is desired.

Ontario.—An early, light-colored variety of very high quality is Ontario. Its berries have not been as large as those of Portland, but its yields are often higher. Ontario could be recommended more highly if it did not lack hardiness in some sections of Ohio. It is a promising variety for regions near Lake Erie.

Niagara.—This is the standard white or green-white grape in Ohio. The bunches are large, and the berries are of good size and quality. It should be allowed to become fully mature before it is harvested. The vines are vigorous and hardy enough to withstand all but the most severe winters in Ohio.

Worden.—Worden is a blue-black grape of high quality. Sometimes it is necessary to harvest it before fully mature to prevent shelling. It is a vigorous and productive variety which ripens just before Concord.

Delaware.—A hardy, red, midseason grape, Delaware should be considered standard in red varieties. The quality of Delaware for table use is excellent. The bunches, as well as the berries, are small, and the total yield is not all that is desired except in fertile soils and under good care.

Concord.—The standard blue-black grape in most of the northern and northeastern states is Concord, a very hardy and highly productive variety on many soils and under most climatic conditions. It is a firm variety and thus can be hauled farther than some others. It can be used for many purposes but is not the best for all purposes. It is being replaced to some extent by varieties suited for the particular purpose for which they are to be used.

Captivator.—This is a fairly hardy red grape of excellent quality. The bunches are not especially compact or attractive. Captivator is suggested for home plantings where high quality is a principal factor.

Golden Muscat.—Golden Muscat is a golden yellow grape of the European type. Because of its size and quality, it is suggested for trial for home use. It requires a long season for ripening. Golden Muscat has often been killed to the ground by the most severe winter temperatures at the Station.

Catawba.—This is a red grape which is recommended for planting commercially only along Lake Erie or on the islands of that lake. At Wooster and in most other sections of Ohio, it does not develop its maximum quality. It is of high quality, especially for juice and wine, when it is grown under suitable conditions. It should be pruned more closely than Concord.

Sheridan.—This is a black grape which is promising for regions where there is little danger of early frost. It matures late and is a good keeper. Sheridan ripens 10 days to 2 weeks later than Concord and is similar to that variety but of higher quality and has a more compact cluster.

STRAWBERRIES

The purpose for which the strawberries are to be produced is important in the choice of varieties. The variety for commercial purposes should be high yielding, dependable, fairly firm, and attractive in appearance. It should also be fairly easy to pick and resistant to leaf spot and to such climatic conditions as late spring frost and wet weather during ripening. The larger commercial growers in Ohio usually plant only a few varieties, often only one or two. The time of ripening is very important, and often success depends largely on this factor.

The berry grower who depends on the local market or on a roadside stand should have ripe berries over a long season. A long season can be accomplished either by the ripening of one or two varieties over a long period or by the choice of early, midseason, and late varieties. This type of grower should select high-quality varieties, although they may not be as firm as desirable for the grower who hauls to more distant markets.

The home gardener should also have a succession of ripe berries through the season. For this purpose, the variety may not be the most productive, but

it should be dependable. It should surely be of the quality that is best liked by the family. General suggestions regarding the quality of different varieties can be made, but the final choice of the home garden selection must depend on individual preferences.

Most strawberry varieties grown in Ohio have perfect flowers and thus require no cross-pollination with other varieties for fruit set. The Howard Supreme and Sample are imperfect-flowering varieties, and if they are used, a perfect-flowering variety should be interplanted every three or four rows. It is preferable to choose a perfect-flowering variety. Unless otherwise noted, all strawberry varieties described in this bulletin are of the perfect-flowering type.

JUNE-BEARING VARIETIES

The strawberry varieties recommended for Ohio are divided into two groups for the convenience of the reader. The first group is composed of the standard varieties recommended for general planting, and the other group is composed of those varieties which are useful in certain locations, to extend the season, or for other special purposes. A third group is given, composed of some newer varieties of particular merit but whose value in Ohio is uncertain.

Standard Varieties

Catskill.—The berries are large, roughly round-conic in shape, and bright red and attractive in color. The quality is good, and the flesh medium firm. The plants are vigorous and leaf-spot resistant and produce many runners. Catskill is a productive, early midseason variety. This variety is being rapidly planted more extensively in Ohio because of its vigorous productive plants and larger-size berries. It is not so resistant to late spring frost as Premier, however. It ripens during the latter part of the Premier season.

Howard 17 (Premier).—The berry is medium to large, conic to long-conic in shape, firm, and of red color. The quality is good but not excellent. The plants are vigorous and exceptionally free from foliage diseases. They are productive and early in season. Premier is one of the varieties most resistant to frost damage. Because of its productiveness, suitability to many soil and climatic conditions, early and long ripening season, and its freedom from foliage diseases, this is by far the leading variety in Ohio. It is not of as high quality as Dorsett or Fairfax, nor is it as firm as Blakemore; nevertheless, it should at present be the standard variety for commercial planting in this State.

Special-Purpose Varieties

Aberdeen.—The fruit is medium to large, conic in shape, attractive, light red in color, slightly acid, of fair quality, and soft. The plants are vigorous and productive. This would be a good variety to follow Howard 17 (Premier) in Ohio if it were more firm. It is highly resistant to red stele disease. Aberdeen is grown extensively as a late variety for local markets but will probably soon be replaced by more recent introductions.

Aroma.—The berry is medium to large, round to round-conic in shape, light red in color, of fair quality, and very firm. The plants are medium in vigor and healthy. Many runners are formed. It is not very productive in northern Ohio but is better farther south on the heavier soils. It is a medium late variety. Aroma has only limited value in Ohio.

Blakemore.—This fruit is medium in size, conic, and bright, light red in color. It is very firm and subacid with fair quality. The plants are fairly vigorous and form many runners. The season is early. It is the leading variety in the United States but is low yielding and of poor quality in most sections of Ohio. It is suggested for trial in Ohio only when an early, very firm, light-colored berry is demanded.

Chesapeake.—This variety has medium to large berries which are round-conic in shape and of high quality with firm flesh. The plants are vigorous but produce few runners. It is not highly productive, and its season is late. Only in rich soil and under irrigation and intensive culture does this variety produce well in Ohio.

Dorsett.—The berries of this variety are large, wedge-conic in shape, and glossy bright red in color. They are of excellent quality and medium firm. The plants are vigorous and free from leaf spot and produce many runners. The season is early. The variety lacks productiveness under most Ohio conditions, and the flowers are susceptible to late frost injury. The high quality of the fruit and the vigorous plants make this variety desirable in some sections of the State, but its lack of productiveness makes it questionable as a commercial variety in Ohio. It is valuable for home use.

Dunlap (Senator Dunlap).—The berries are medium to below medium in size, long-conic in shape, deep red in flesh color, high in quality, and soft. The plants are not vigorous but form many runners, and they are relatively unproductive. The season is medium early. Since its foliage is healthy and the berries are of high quality, Dunlap was once an important variety in Ohio. It has been replaced largely by Howard 17 (Premier) because of size of fruit and productiveness.

Fairfax.—The berries of this variety are large, wedge-conic shaped, and bright red in color when first ripe; they soon turn to deep red. The quality is excellent for dessert, and the flesh is firm. The plants are vigorous and form many runners, which often require thinning. The plants are fairly productive and medium early. The chief fault of the variety is that the berries turn dark soon after they are ripe, even though they are still firm. Because of its high quality, larger-size berries, and vigorous plants, Fairfax is especially suited to the home garden.

Gandy.—The fruit is medium to large in size and of crimson color with red flesh. The quality is good, and the flesh is firm. The plants are fairly vigorous but not highly productive, and the season is late. It is susceptible to leaf spot and other foliage diseases. This variety is not grown in Ohio so much as formerly. It is most productive on heavy soil.

Parsons (Gibson).—The fruit is medium in size, wedge-conic shaped, dark red, of fair quality, and of medium firmness. The plants make many runners and are productive, although the foliage is susceptible to leaf spot. The berries are ripe in early midseason. This variety ripens during the latter part of, and just following, the Howard 17 (Premier) season. The more recent variety, Catskill, is preferable for that season.

Pathfinder.—The fruit of this variety is large, round to round-conic in shape, light to medium red, of good quality, and medium firm. The plants are vigorous, form many runners, and are productive. The season is a little later than that of Howard 17 (Premier). The plants are not entirely free from leaf spot in Ohio. Evidently the plants are resistant to red stele. Pathfinder is worthy of trial where a berry of good size and light color is desired.

Sample (imperfect).—The berry is medium in size, conic shaped, medium dark red in color. The quality is good, but the flesh is rather soft. The plants produce many runners and are productive. This variety ripens in midseason. Sample is liked by some mainly because of its attractive dark red fruit. It is sometimes subject to leaf spot, however, and the fruit is too soft. It is an imperfect variety and thus requires another variety to pollinate it. It has been largely replaced by Howard 17 (Premier).

Promising New Varieties

Dresden.—The fruit is large, uniform, regular, conic in shape, attractive bright red in color, of fair quality, and medium firm. The plants are vigorous, very productive, and free from leaf spot. The season is early. The size of the berries holds up well, but the picking season extends little later than that of Howard 17 (Premier). The Dresden is well liked by most who have tried it in Ohio. It is preferred by some because of its high quality and large, uniform fruit.

Northstar.—The berries are large, conic to oval in shape, light in color, attractive, and uniform. The flavor is tart, and the flesh is fairly firm. The plants are vigorous and medium in productiveness. The season is early. This variety is recommended for trial as a commercial berry because of the large and attractive berries and the vigor of the plants.

Redstar.—This variety has large-sized fruit and vigorous, productive plants. It is a late variety that was recently introduced, and it is very promising as a commercial berry for Ohio. It seems resistant to leaf spot. Redstar berries are firm and of high quality. It is suggested for trial as a late variety.

Starbright.—This is a recent introduction by the United States Department of Agriculture which is promising as a variety to replace Chesapeake, an old late variety. The Starbright berries are firm, attractive, and of good quality. The foliage seems leaf spot resistant. The plants produce many vigorous runners.

FALL- OR EVERBEARING VARIETIES

Gem.—Gem berries are of medium size, light red in color, tart, and of fair to poor quality. The flesh is firm. The plants are small but form many runners. The peak production is during the first part of August.

Green Mountain.—This variety produces medium- to large-size berries of light red color, fair quality, and firm flesh. The plants are vigorous and produce a limited number of runners. The height of production is during September. Green Mountain has not been very productive at Wooster.

Mastodon.—The most common everbearing variety grown in Ohio is Mastodon. The fruit is medium to large sized, of fair quality, and firm. The plants are vigorous and usually form a good matted row. Mastodon is productive in comparison with most other everbearers, and it has a long season, extending through August and September and reaching a peak about October 1 at Wooster.

Rockhill (Wayzata).—This variety produces large-size berries, roughly conic in shape, bright red in color, of high quality and firm flesh. The plants are vigorous but form few runners. The season and productiveness are about like those of Mastodon at Wooster.

VARIETIES TO GROW IN OHIO

A few general suggestions may be helpful in the selection of strawberry varieties, but it is well recognized that local conditions may warrant quite different recommendations.

The Howard 17 (Premier) is, and should be, the standard commercial strawberry variety in Ohio. For over 25 years, it has been, in general, the most satisfactory variety tested at the Ohio Agricultural Experiment Station for commercial planting. Its earliness, long ripening season, productiveness, freedom from disease, and frost resistance have all contributed to this result. Nevertheless, some of the newer varieties are now being suggested for trial or for limited commercial planting. When a premium is paid for high quality, Dorsett and Fairfax can be used, preferably as a supplement to Premier, since they usually yield less than Premier. Catskill is also being used as a supplement to Premier because of its higher quality and large size during the latter part of the Premier season. Dresden and Northstar are suggested for trial commercially because of their high yields and uniformly larger berries. No everbearing varieties are suggested commercially.

Varieties for the home garden should include such high-quality ones as Dorsett and Fairfax, or both. Aberdeen and Chesapeake can be used to extend the season. Starbright and Redstar can be tried for the later varieties, since they are promising and of high quality. If a fall-bearing, or everbearing, type is desired, Rockhill (Wayzata) is suggested.

RASPBERRIES

RED (LISTED IN ORDER OF RIPENING)

June.—This is a very early, bright red berry of medium size. It is somewhat soft, and its quality is only fair. It is very susceptible to the virus diseases and must be rogued frequently. The chief merit of this variety is its ripening season, and it is recommended to only a limited extent for commercial planting in Ohio.

Newburgh.—This is a very large, round, firm berry which ripens just before Latham. The plants (fig. 8) are low growing but vigorous and very productive. The canes do not hold up well under a load of fruit; hence, they should be supported in some way. Newburgh is being grown in Ohio more and more as a variety to precede Latham. Its season overlaps that of Latham, but usually the fruit can be picked once or twice before the Lathams are ready. The high production of large firm berries and the resistance to mosaic seem to be the outstanding merits of Newburgh. The plants seem to grow and produce best in soils with high water-holding capacity but well drained. Newburgh is hardly as hardy as Latham. Because of its mosaic resistance, it is especially promising for growing near black varieties.

Marcy.—Marcy has two outstanding merits, large berries and high yields. It also seems fairly resistant to mosaic. It has not been extremely hardy at the Station, especially to low temperatures late in the spring. Marcy has not been grown extensively in Ohio and can be suggested only for limited trials.

Latham.—The standard red variety for Ohio is Latham, which produces large, firm berries of fairly good quality. The plants (fig. 8) are especially vigorous, productive, and suitable for a variety of soils. Relatively high yields can be maintained with comparatively little care, but Latham does respond to culture more than is sometimes realized. The plants are very hardy to low winter temperatures in Ohio. Although they are very subject to mosaic, they

Fig. 8.—Two of the best red raspberry varieties for Ohio

This photograph taken in the Experiment Station variety planting shows the vigorous cane growth with few laterals in the Latham (right) and the low, much-branched growth in the Newburgh (left).

produce well in spite of the disease. The fruit is easy to pick, and the season is fairly long. Latham should not be grown nearer than about 20 rods to black varieties because of the transfer of mosaic from the Latham.

Taylor.—Taylor plants have been vigorous and productive at Wooster, and the berries have been of good size and of higher quality than those of Latham. The variety ripens at the same season as Latham. Its plants seem hardy enough for Ohio conditions and should be tested more extensively in various parts of the State.

Indian Summer.—Indian Summer is a fall- or "everbearing" red variety that bears a light crop very early in the spring. Where a fall-bearing variety is desired, Indian Summer is worthy of extensive trial. Its fruit is relatively large for the fall season, of good quality, but fairly soft. The plants have been productive and hardy at the Station and at the few other plantings in Ohio. The fall crop ripens from about September 15 until severe frost. Indian Summer will probably be in greatest demand among home gardeners.

BLACK (LISTED IN ORDER OF RIPENING)

Logan (New Logan).—This variety has been increasing in popularity recently. Logan bushes can usually be picked over at least once before the Cumberlands are ripe, and Logan is probably the most desirable variety to precede Cumberland in Ohio. Yields at the Station have been about equal to those of Cumberland, but the quality and size of the berries have been hardly as good.

Bristol.—This is a relatively new variety from the New York Experiment Station. It ripens just before, or during, the Cumberland season. During the last 3 years, the Bristol berries have been larger, higher in quality, and higher yielding than those of Cumberland. Bristol seems well worthy of trial.

Cumberland.—This should be the standard commercial midseason black raspberry in Ohio. It is attractive, glossy, large, firm, and of good quality. The plants are very susceptible to anthracnose, as well as to virus diseases. They are vigorous and productive, however, where these diseases are at a minimum.

Naples.—This is another New York Station introduction. It ripens during the latter part of, and just after, the Cumberland season. It is evidently the most desirable variety for that season. Its fruit is of fairly high quality, and its plants have been vigorous though only fairly productive.

PURPLE

Sodus.—This is a very promising variety which is highly recommended for limited planting where purples are desired. The plants are extremely vigorous and productive. It has been more satisfactory than either the Potomac or Columbian. Its fruit is larger, lighter in color, and of higher quality than that of Potomac, which has been grown most in Ohio. Sodus is being used considerably for canning in New York State. This variety is subject to mosaic and, therefore, should not be grown near such varieties as Latham.

Marion.—This variety is suggested for trial where a purple berry ripening after Sodus is desired. The berries are large, firm, and of fairly good quality. The plants are vigorous and hardy and bear well.

BLACKBERRIES

Eldorado.—The Eldorado is recommended at present as the standard blackberry in Ohio. It is glossy, attractive, and fairly large. The canes are vigorous and strong. The plants are productive, and the quality of the berries is good. True-to-name stock is not always obtained, but the true Eldorado is probably the best variety for this State.

THE BOYSENBERRY, DEWBERRY, AND OTHERS OF THIS TYPE

Since its introduction in 1935, the Boysenberry has received wide publicity. It has now been grown for several years at Wooster, as well as by a number of growers in other parts of Ohio. The growth of the Boysenberry is similar to that of the common dewberry, and the plants require training on a wire or other type of trellis. The plants are not extremely hardy to low temperatures in Ohio and should be protected during the winter by a covering of soil or a mulch of straw or other material. The berries are of high quality but somewhat acid until they are quite ripe. They ripen over a long period. The Boysenberry is probably of most value in Ohio as a home garden crop or in a limited way for roadside markets.

Several other berries with trailing growth have been tried in Ohio, but none of them has proved worthy of commercial production. These berries include Lucretia dewberry, Loganberry, Nectarberry, Youngberry, and Brainard blackberry. They are, as a whole, not hardy enough to withstand the low winter temperatures often occurring in this State.

CURRANTS

Wilder.—This is the most common standard red currant grown in Ohio. It is usually preferable because of the long, compact clusters and vigorous, productive bushes. The berries are large, bright, and attractive. The season is fairly long.

Red Lake.—This variety is slightly later than Wilder and produces larger clusters and berries. Its quality is good. The plants are vigorous, strong, and usually more productive than those of Wilder. Red Lake is being grown more and more extensively in Ohio and is the preferable variety where earliness is not an important factor.

The planting and growing of the English black currant varieties (*Ribes nigrum*) is prohibited by State regulation, because these fruits are very susceptible to the white pine blister rust and are the most active agent concerned in the spread of this disease. The native American black currant varieties, such as Crandall, are not subject to these restrictions.

GOOSEBERRIES

Downing.—The standard green-colored gooseberry variety for Ohio is Downing. The plants are vigorous and highly productive. The fruit is medium in size with thin skin. The quality is very good.

Fredonia.—This is a dark red gooseberry of medium to large size and good quality. It has not been tested as extensively as Poorman but is suggested as a late red variety in this State.

Poorman.—This is a very high-quality red gooseberry and is preferred by many. The berries are especially large and attractive. Plants of this variety are vigorous and high yielding. Poorman is the standard red variety for Ohio.

BLUEBERRIES

Blueberries have never been important as a commercial crop in Ohio, but within the last few years, there has been considerable inquiry about the growing of blueberries in various parts of the State, largely since the development of superior varieties in other states.

The wild blueberries (*Vaccinium*) are sometimes incorrectly called huckleberries (*Gaylussacia*). There are distinct differences between the two fruits. Probably the simplest means of distinction is that the blueberry contains many small seeds, whereas the huckleberry contains 10 large hard-coated seeds.

Blueberries are usually divided into the high-bush, half-high, and low-bush types. This discussion is limited to the high-bush blueberry, since it is by far the principal one cultivated. It has several specific soil requirements. Although blueberries are sometimes found on the higher sites, they often grow wild along the edges of ponds and sometimes in swamps, a situation which is responsible for the erroneous idea that blueberries should be planted in a bog or swamp. In most every instance where blueberries have been planted under such conditions, they have failed. Where wild blueberries are growing in swampy places, they are located on hummocks so that the plants are raised a foot or more above the water level and the roots are not submerged in the water. For best results, the water table should be 14 to 22 inches below the surface, particularly in April, May, and June.

A good soil for blueberries is one that is acid, fertile, plentifully and continuously supplied with water, well drained, and well aerated. Evidently blueberry plants grow best in soils having a pH between 4.5 and 5.0. Sometimes soils are acidified by the use of sulfur or aluminum sulfate, but this practice has not been completely successful for growing blueberries, and more experimental work is necessary along this line. The plants must be kept in a vigorous condition at all times. Nitrogenous fertilizers, such as sulfate of ammonia,

are most likely to prove beneficial, although in some locations a complete fertilizer is recommended. If the soil is likely to become dry during the summer, some method of supplying the necessary moisture should be provided. Water standing on the surface of the soil, even for short periods, however, will damage the plants, especially during the growing season. Soils composed of much sand and organic matter seem most satisfactory.

The development of improved blueberry varieties has been rapid in recent years. The varieties suggested for those who wish to try to grow this fruit in Ohio are Cabot, Pioneer, and Rubel. They are listed in their order of ripening. The Rubel has been used most extensively in commercial blueberry regions.

Cabot.—The Cabot fruits are large, attractive, firm, and of very good quality. The plants are not extremely vigorous and are spreading in growth habit. Cabot is recommended as an early variety for this State.

Pioneer.—The plants of this variety are more vigorous than those of Cabot and yield more heavily. The fruit is light blue in color, very large, firm, and of high quality. The fruit ripens about 10 days after Cabot.

Rubel.—This is the standard midseason variety. It is one of the easiest to propagate and is vigorous and productive. It is a very good grower and productive, but its quality is not quite so good as that of Pioneer or Cabot. It ripens 4 to 6 days later than Pioneer.

LITERATURE CITED

1. Conrey, G. W., A. H. Paschall, and E. M. Burrage. 1937. A key to the soils of Ohio. Ohio Agr. Exp. Sta. Spec. Cir. 44.
2. Ellenwood, C. W. 1940. The optimum life of an apple orchard. Ohio State Hort. Soc. Ann. Rep. for 1940: 96-101.
3. ————. 1940. Apple variety trends in Ohio. Ohio Agr. Exp. Sta. Spec. Cir. 60: 4-5.
4. ————. 1941. Bloom period and yield of apples. Ohio Agr. Exp. Sta. Bull. 618.
5. ————. 1941. Fruit characteristics of red strains of apples. Ohio Agr. Exp. Sta. Bimo. Bull. **26**: 216: 120-127.
6. ———— and J. S. Shoemaker. 1933. Dependable fruits. Ohio Agr. Exp. Sta. Bull. 528.
7. Havis, Leon. 1938. Peach tree root distribution. Ecology **19**: 3: 454-462.
8. ————. 1942. Strawberry production in Ohio. Ohio Agr. Exp. Sta. Bull. 626.
9. ———— and J. H. Gourley. 1937. Peach production in Ohio. Ohio Agr. Exp. Sta. Bull. 581.
10. Howlett, F. S. 1927. Apple pollination studies in Ohio. Ohio Agr. Exp. Sta. Bull. 483.
11. ————. 1931. Factors affecting fruit setting. Stayman Winesap. Ohio Agr. Exp. Sta. Bull. 483.
12. ————. 1935. Pollination of the pear in Ohio. Ohio Agr. Exp. Sta. Bimo. Bull. **20**: 173: 84-89.
13. Lewis, I. P. 1924. Planting the orchard. Ohio Agr. Exp. Sta. Monthly Bull. **9**: 3 and 4: 47-56.
14. Shoemaker, J. S. 1928. Cherry pollination studies. Ohio Agr. Exp. Sta. Bull. 422.
15. ————. 1930. Raspberries and blackberries in Ohio. Ohio Agr. Exp. Sta. Bull. 454.